

FLIGHT

&
The AIRCRAFT
ENGINEER.

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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CONTENTS.

	PAGE
Editorial Comment :	
The Two Futures for Flight	1365
Mercy for the Poor Hun!	1366
The Future of the W.R.A.F.	1368
Honours	1369
The Two Futures for Flight. By H. Massac Buist	1370
Service in the R.A.F.	1373
Notes on German Bombers	1375
Stress Optical Experiments. By Major A. R. Low, R.A.F.	1379
The Roll of Honour	1382
The Trend of German Aeroplane Design	1383
The R.A.F. Airships	1385
Airisms from the Four Winds	1386
Personals	1388
The Royal Air Force	1390
Side Winds	1394

"FLIGHT" CHRISTMAS GREETING

Next week a special 32-page two-colour Christmas Greeting Supplement will be issued with "FLIGHT," the price of the double number being ONE SHILLING.

EDITORIAL COMMENT.

MR. MASSAC BUIST'S thoughtful articles under this title, which have appeared in the pages of "FLIGHT," are well worth pondering by everyone who has the future interests of the industry, and the movement generally, really at heart. We need not traverse his articles at any considerable length. His conclusions are there to speak for themselves and they are so well expressed as to require neither explanation nor qualification. There are, however, certain aspects of the question at large upon which we feel that we may perhaps usefully add a few words of our own. Many times recently we have sounded a note of alarm at the symptoms, so easily discernible, that the intention exists to make the future of aviation in this country the plaything of the New Bureaucracy. We have pointed out how, gradually at first and then more rapidly as the

war could be seen to be drawing to an end, the process of what we once called "khaki-ising" the industry was given effect. How the element of civilian control became a vanishing quantity in the factories and how, under the Munitions of War Act, the bureaucracy assumed more and more control over the whole movement, until it became almost true to say that the industry was left without a soul to call its own. Now, we realise to the full that many, if not most, of the measures adopted by the Government, for the control of output were justifiable at least—even probably necessary—for the carrying on of the War to a victorious end. But the measures which were taken did not stand alone. They were accompanied by an atmosphere of finality, as it were, as much as to say that now the State had taken over control of everything "for the duration" ostensibly, there was no intention on the part of those constituting the bureaucracy of war-time that things should ever revert to their former status. It is true that this has never been put into bald words. We doubt if even the most hardened adherent of bureaucratic methods would be so indiscreet as to raise the alarm by saying out of hand that the aviation industry and the great movement it serves was intended to remain for all time a virtual monopoly of the State. Neither has anyone said as much in the case of any other of our war industries, but he who runs may read the intention quite plainly in the case of half-a-dozen other industries and enterprises, as for example the railways, the coal-mines and the shipping of the country. As to the rest, we are only concerned with them on the general principle that a monopoly of any kind is an evil thing, and a State monopoly the most evil of all. In the case of the aviation industry we have a much closer concern with what is toward and we certainly do not intend to sit quietly and watch the future of the movement being absorbed into the hands of the bureaucracy. That is why we agree absolutely with Mr. Massac Buist that it is essential that every single person interested in the movement must do his share in the work of maintaining freedom of action for the industry and the right to develop along the lines which may be settled by each individual firm for itself. In a word, the movement must be completely independent of all interference with its growth, direct or concealed. Unless we can obtain such a measure of independence of Government control we are but wasting

our time and would do better to sell matches and bootlaces in the street. Certainly there might not be quite as much money in it, but there would at least be the absence of the feeling of fighting a hopeless fight against overwhelming odds of obstruction and interference and we should sleep better o' nights. Therefore, we most strongly advise all our readers to follow the advice given to them in the articles under review and to see that every candidate for Parliament at this and every succeeding election, no matter what the rest of his programme may be, should be asked to give a definite assurance of his policy regarding aviation. He—or she as the case may be nowadays—should be asked to give a pledge that if he is returned to the House of Commons he will actively oppose and vote against any Government which proposes to jeopardise the future safety of the Empire, and the future of aviation within the Empire, by establishing a scheme of bureaucracy to control either the industry, or the free development of the movement, or both. The formula is a simple one and will bear quoting here, although our readers will find it at the conclusion of Mr. Massac Buist's article, printed in another part of this issue of "FLIGHT." Let each candidate be asked to say definitely that he pledges himself to oppose the establishment of a bureaucracy in connection with the development of aviation, alike for military, public and private purposes in these islands; and that he will advocate limiting Government control in these matters to the mere assurance of the safety of the public and the maintenance of efficiency of the military aviation services, for the rest encouraging individual investigation, invention, construction and flying enterprise in every way possible.

There is certainly nothing in this formula at which the most pronounced partisan politician can boggle. It is the essence of simplicity and perfectly intelligible to the least understanding of them all. Moreover, there is nothing in it to which any reasonable person can object unless with an ulterior motive to serve. Let it, then, be put and we shall soon see which way the wind blows and whether we are to be left free to pursue our development in peace or whether we are to have to fight tooth and nail to clear ourselves from the trammels of bureaucratic control.

Mercy for the Poor Hun!

We confess we are more than suspicious of the amount of special pleading on behalf of the poor Hun which is being led in many quarters of the community. We have no patience to traverse the arguments about Germany's starving conditions and of why we should feed her so that she may not relapse into Bolshevism; of how it is impossible that she can be made to pay for her misdeeds, except "within her capacity"; of how we have not been at war with the German people; and about the supposed "change of heart" which the Hun has undergone as a result of his abject defeat by land and sea. The whole of the arguments are perfectly familiar to all who read their newspapers, so there is the less need to repeat them. But we do think the time is now for every organ which is in a position to express opinion to put it on record that the people of this country—of the whole Empire—are solidly in favour of making Germany pay up for her crimes to the very last penny, and that they do not intend that there should be any paltering with the essentials.

Germany is *not* starving. Her people, like those of all the belligerent countries, have had to suffer privation inseparable from a state of war. Germany gathered her harvests in September and they were up to, or a little better than the average. Now, that means she has in hand supplies of food for a minimum of 26 and a possible maximum of 40 weeks. Ergo, there can be no question of starvation. Not that we could feel a great deal of sympathy with her if she were. Her conduct towards our prisoners and towards the unfortunate inhabitants of occupied countries during the war has been such that it would leave us cold to hear that her people were in fact starving. But she is not, and the cry has obviously been raised with the purpose of getting the sympathy of the soft-hearted cranks who willingly brief themselves for every cause but that of their own country. And while we are talking about feeding Germany, we are rationed with an ounce of butter a week!

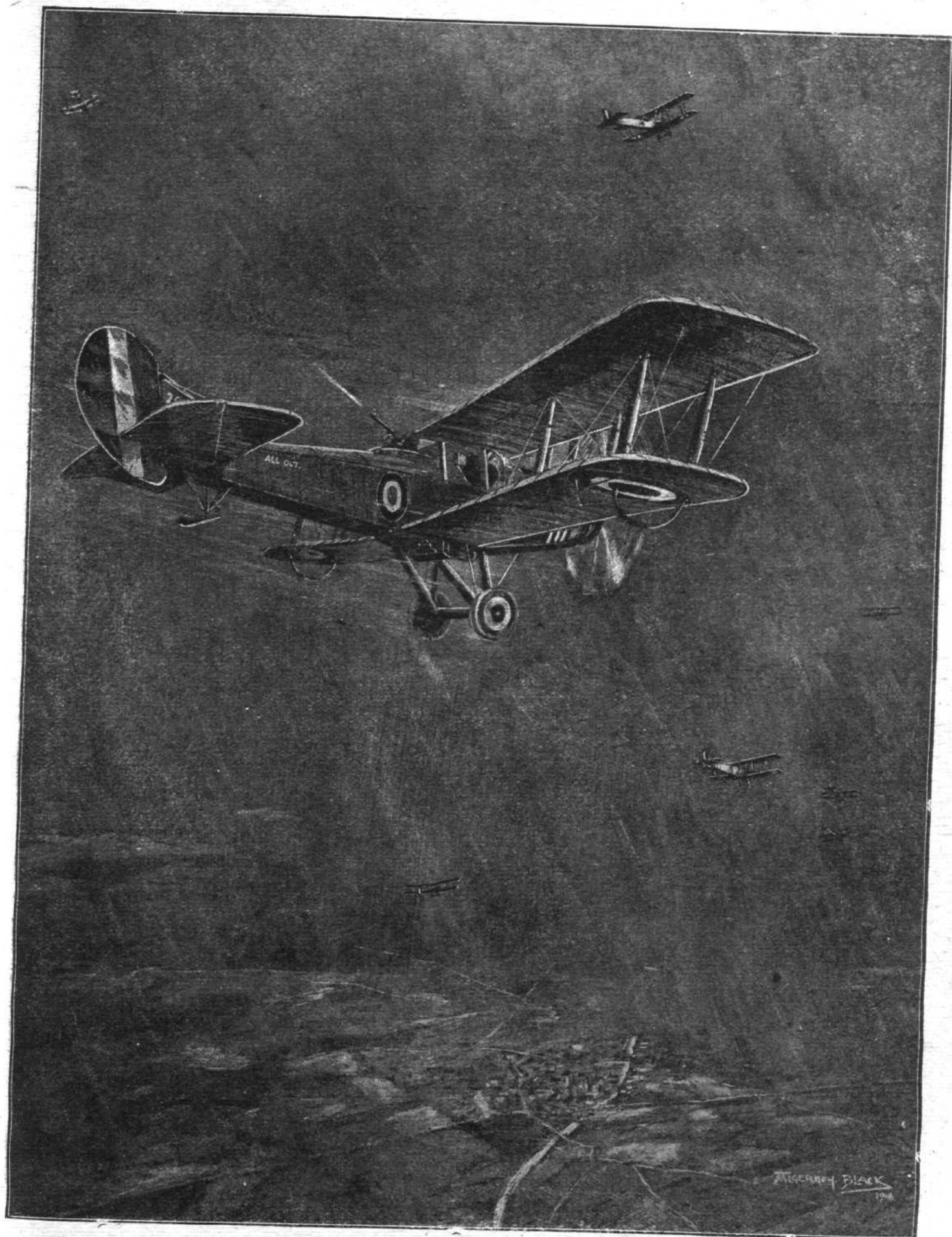
Then, it is time we had something more definite in the way of a pronouncement from the War Cabinet than we have had so far regarding the payment of the cost of the war. We have had literally nothing save the very indefinite promise made by Mr. Lloyd George at Newcastle, which really takes us but a very little way. It is a good maxim in all games of hazard that the loser pays, and it applies to the hazards of war no less than to those of peace. Germany forced the war upon us. We did not want it—and it has cost us nearly ten thousand millions. We have a debt charge of approximately £8,000,000,000, which is to say that four years of war have increased our public indebtedness nearly ten-fold. Taking the usual basis of six per cent. to cover loan services and sinking fund—which is too low an estimate in the present state of the money market—this means that we shall have to raise £480,000,000 annually for some years to come over and above the ordinary revenue of the country. Taxation must remain at an inordinate level and the position will be that the whole community will be working like slaves to pay the bill forced upon us by Germany—unless the latter is compelled to assume the indebtedness that is by right her own. Is she? We do not know what the views of the Government are, but we think we *do* know the sense of the country and we are equally certain that it will fare ill with a Government that comes back from Versailles with a treaty of peace in which Germany is let off her liabilities. The country means that Germany shall be made to pay, and the sooner our politicians allow that to sink well into their understanding the better it will be for the country and for themselves.

Again, what about the punishment of the arch-criminal and his personal gang? Are they to be duly tried and hanged or is "the divinity which doth hedge about a king" to protect the Hohenzollern and his satellites? Once more we do not know, nor will the Government tell us in plain words what it intends to do. The country knows what it wants and we are gravely mistaken if the country does not have its way. We say with all due sense of responsibility that a Government which would allow the Kaiser to go free of punishment for his crimes is risking something very much like revolution at home.

On the question of the payment of war costs the country feels equally deeply, nor can the plain man in the street understand whence comes all the talk

about "no indemnities." He cannot see why the British taxpayer should be saddled with the bill for the monstrous iniquities of the loathly Hun. He knows that the latter possesses vast accumulations

of potential wealth—wealth which should be and must be appropriated to the payment of the bill. He knows that German influence is strong in high places and that the power of cosmopolitan finance is great.



THE R.A.F. AT WORK.—Braving the elements. A British bombing formation returning from a raid over enemy territory, caught in a rain-storm.

Nor can the fact be ignored that in both directions immense influence is being brought to bear in favour of lenient treatment for the Hun. It will not do, however, and the Government that is satisfied with anything less than the skin of the beast now that it is dead will be playing with fire—and will of a surety be burnt.

The Future of the W.R.A.F.

According to *The Times* there is more than a little prospect of the W.R.A.F. becoming a permanent service, and that women who signed on for the duration of the War may have the option of remaining in the Force under new conditions. The Force now numbers some 23,000 women and girls, of whom 6,600 were taken over from the W.A.A.C. and a further 2,000 from the W.R.N.S., the remainder having been directly recruited. Before going any further with the discussion of the matter at large, it may be remarked that it is a little early to lay down establishments and to decide what parts of our temporary war organisation are to be kept up. Parliament and the Tax-payer will certainly have a voice in the matter, and very properly so. Moreover, those who are straining every nerve to consolidate their temporary positions into permanent posts appear to forget that as the War has been waged in order that militarism and War shall become things of the past, it is reasonably certain that there will be clauses in the Peace Treaty setting forth the basis of the armed forces which each component State of the League of Nations may keep permanently established. Therefore, all the talk that is going the rounds about the retention of this and the escape from demobilisation of the other is, to say the least, slightly premature.

Now, as to the future of the W.R.A.F., this is a question which will require the most careful consideration, since there are a number of factors which will have to be taken into account and very nicely balanced before any final decision can be taken. It must be said at once that the idea that all these 23,000 women and girls, embodied for war service, can be kept on permanently after peace is hardly reasonable. It would be just as reasonable as to argue that the whole of the New Armies should be kept under arms. Nor has the W.R.A.F. been such a signal success all round as to justify even the beginnings of the idea. In certain directions the *personnel* of the Force has been exceedingly useful. Domestic ratings, fabric workers, typists and office

workers have been able to release a considerable number of men for more laborious tasks and for the fighting line. But when we come to consider the case of the transport drivers, the telephonists and others the *raison d'être* of their recruitment is not so apparent. We do not presume to say that these have not been useful at all. On the contrary, many of them have done excellent work. It is nevertheless a fact that the number of men released by them has been very small, owing to the limitations placed by authority on their hours and conditions of work. For example, women drivers are not allowed to undertake long journeys of more than 40 miles each way, so that men have to be retained at the stations to act as emergency drivers. Again, if any journey is to be undertaken after 9 p.m. a male driver is required. The consequence of this sort of thing is reflected by a case in point of one South Coast station possessing four or five cars for which there were a short time ago eight women drivers, with a corporal and nine men kicking their heels about the garage to take over the duty the women were not allowed to do.

In the case of female telephonists attached to stations, up to a short time ago these were not allowed to be on duty after 6 p.m., though the hour has now, we believe, been extended to 9 p.m. Consequently, there had to be male operators carried on the establishment to act as night reliefs. And so on all down the list. Admitting that a great deal of admirable work has been done, we are very strongly of opinion that there is a case for the closest enquiry before the decision is taken to continue the W.R.A.F. as a permanent service on its existing basis. Undoubtedly, there will be a great deal of scope for women's work in connection with the R.A.F., but to simply lay down that the W.R.A.F. is to be continued as at present would be against public policy. We shall have to maintain a powerful air service after the War is definitely ended, but the needs of national economy must be studied, and it seems to us that one of the first directions in which economies can most usefully be effected is in relation to such bodies as the W.R.A.F. and the naval and military organisations corresponding to it. We have no axe to grind, nor do we desire to be thought hypercritical of women's services in the War, but we should be failing in our duty did we not point out that where economy is to be the order of the day it may well begin in the direction of the less efficient and necessary parts of our future peace organisation for defence.



The Queen at the Royal Agricultural Hall

THE Queen visited the aeroplane repair dépôt of the R.A.F. at the Agricultural Hall, Islington, on November 30th, a contingent of 100 members of the W.R.A.F. forming a guard of honour. The Queen was shown round the workshops by the Commanding Officer, Major Morgan, and saw some hundreds of women engaged on the repair of aeroplane wings, etc., being specially interested in the section devoted to woodwork. Subsequently Her Majesty made a tour of the galleries where the captured German aeroplanes are displayed.

Release from the Air Service

THE Air Ministry announces that the naval and military situation does not admit of any officers or airmen being released from service, except on compassionate grounds as hitherto, and, in a limited number of special cases, where particular individuals or classes are urgently required for the purpose of reconstructing industrial conditions prior to demobilisation.

The responsibility for dealing with all applications in the

latter class of case rests with the Ministry of Labour, which is making a separate announcement as to the procedure to be adopted.

The offices of the Controller-General of the Civil Demobilisation and Resettlement Department have been removed from 6, Whitehall Gardens, to 8, Richmond Terrace, Parliament Street, S.W. Employers of labour desirous of obtaining the release from the Army of former employees should address their requests with full particulars to Sir Stephenson Kent, Controller-General, Civil Demobilisation and Resettlement Department, Ministry of Labour, 8, Richmond Terrace, Parliament Street, S.W.

The Institute of Metals at Sheffield

A LOCAL section of the Institute of Metals has now been formed in Sheffield, the recently dissolved Sheffield Society of Applied Metallurgy forming the nucleus of the new section. The Secretary of the Institute is Mr. G. Shaw Scott, 36, Victoria Street, S.W. 1, and he will be glad to send particulars to anyone interested.

HONOURS

Two More V.Cs.

It was announced in a supplement to the *London Gazette*, on November 30th, that the King has been pleased to confer the Victoria Cross on the following officers of the Royal Air Force, in recognition of bravery of the highest possible order:—

Capt. (acting Major) WILLIAM GEORGE BARKER, D.S.O., M.C., No. 201 Squadron, R.A.F.

On the morning of October 27th, 1918, this officer observed an enemy two-seater over the Forêt de Mormal. He attacked this machine, and after a short burst it broke up in the air. At the same time a Fokker biplane attacked him, and he was wounded in the right thigh, but managed, despite this, to shoot down the enemy aeroplane in flames. He then found himself in the middle of a large formation of Fokkers, who attacked him from all directions, and was again severely wounded in the left thigh, but succeeded in driving down two of the enemy in a spin. He lost consciousness after this, and his machine fell out of control. On recovery he found himself being again attacked heavily by a large formation, and singling out one machine, he deliberately charged and drove it down in flames. During this fight his left elbow was shattered and he again fainted, and on regaining consciousness he found himself still being attacked, but notwithstanding that he was now severely wounded in both legs and his left arm was shattered, he dived on the nearest machine and shot it down in flames. Being greatly exhausted, he dived out of the fight to regain our lines, but was met by another formation which attacked and endeavoured to cut him off, but after a hard fight he succeeded in breaking up this formation and reached our lines, where he crashed on landing. This combat, in which Major Barker destroyed four enemy machines (three of them in flames), brought his total successes up to 50 enemy machines destroyed, and is a notable example of the exceptional bravery and disregard of danger which this very gallant officer has always displayed throughout his distinguished career.

Major Barker was awarded the Military Cross on January 10th, 1917; first Bar on July 18th, 1917; the Distinguished Service Order on February 18th, 1918; second Bar to Military Cross on September 16th, 1918; and Bar to Distinguished Service Order on November 2nd, 1918.

Lieut. (acting Capt.) ANDREW WEATHERBY BEAUCHAMP-PROCTOR, D.S.O., M.C., D.F.C., No. 84 Squadron, R.A.F.

Between August 8th, 1918, and October 8th, 1918, this officer proved himself victor in 26 decisive combats, destroying 12 enemy kite balloons, 10 enemy aircraft, and driving down four other enemy aircraft completely out of control. Between October 1st, 1918, and October 5th, 1918, he destroyed two enemy scouts, burnt three enemy kite balloons, and drove down one enemy scout completely out of control. On October 1st, 1918, in a general engagement with about 28 machines, he crashed one Fokker biplane near Fontaine and a second near Ramicourt; on October 2nd he burnt a hostile balloon near Selvigny; on October 3rd he drove down, completely out of control, an enemy scout near Mont d'Origny, and burnt a hostile balloon; on October 5th the third hostile balloon near Bohain. On October 8th, 1918, while flying home at a low altitude, after destroying an enemy two-seater near Maretz, he was painfully wounded in the arm by machine-gun fire, but, continuing, he landed safely at his aerodrome, and after making his report was admitted to hospital. In all he has proved himself conqueror over 54 foes, destroying 22 enemy machines, 16 enemy kite balloons, and driving down 16 enemy aircraft completely out of control.

Capt. Beauchamp-Proctor's work in attacking enemy troops on the ground and in reconnaissance during the withdrawal following on the battle of St. Quentin from March 21st, 1918, and during the victorious advance of our Armies commencing on August 8th, has been almost unsurpassed in its brilliancy, and as such has made an impression on those serving in his squadron and those around him that will not be easily forgotten.

Capt. Beauchamp-Proctor was awarded Military Cross on June 22nd, 1918; D.F.C. on July 2nd, 1918; Bar to M.C. on September 16th, 1918; and Distinguished Service Order on November 2nd, 1918.

Cairo to Baghdad

ANOTHER achievement lies to the credit of the Royal Air Force.

On November 29th Major-Gen. Salmond, R.A.F., Brig.-Gen. Boston, R.A.F., and Capt. Ross Smith, A.F.C., with two mechanics started from Cairo in a Handley-Page machine

Foreign Decorations

It was also announced that the King has granted unrestricted permission for the wearing of the following decorations, conferred on the officers and other ranks indicated in recognition of valuable services in connection with the War:—

CONFERRED BY THE GOVERNMENT OF THE FRENCH REPUBLIC

Legion d'Honneur

Croix d'Officier

Col. (A./Brig.-Gen.) R. E. Trower Hogg, C.I.E. (Ind. Army).

Maj. (A./Lieut.-Col.) A. V. Holt, D.S.O. (R. Highrs.).

Lieut.-Col. R. P. Mills, M.C. (R. Fus.).

Croix de Chevalier

Lieut. (A./Capt.) O. M. Baldwin, D.F.C.; Lieut. (A./Capt.) G. L. Graham, D.F.C.; Lieut. (A./Capt.) W. B. Green, D.F.C.; Sec. Lieut. (Hon. Lieut.) C. P. Harrison, M.C.; Lieut. (A./Capt.) E. J. Salter; Capt. H. W. Woollett, D.S.O., M.C. (Linc. R.).

Medaille Militaire

2249 Sergt.-Mech. H. W. Bush (Paddington, W.); 140801 Pte., 1st Cl., E. R. Macdonald (Matheson, Ont., Can.); 15399 Sergt. S. B. Percival (Manch. R., attd. R.A.F.) (killed August 14th, 1918); 240289 Sergt.-Observer F. L. Roberts (Finsbury, London).

It was announced in a supplement to the *London Gazette* on November 29th that the following decorations have been awarded by Allied Powers for distinguished services rendered during the course of the campaign:—

CONFERRED BY THE PRESIDENT OF THE FRENCH REPUBLIC

Croix de Guerre

25862 1st Class Air-Mech. F. H. Freeman, No. 242 Squadron, R.F.C.

CONFERRED BY THE KING OF THE BELGIANS

Croix de Guerre

Temp. Sec. Lieut. J. A. Higham, R.F.C.

Awards for Mesopotamia

It was announced in a supplement to the *London Gazette* on December 2nd that the King has been graciously pleased to approve of the following awards to the undermentioned officers in recognition of their gallantry and devotion to duty in the Field:—

Distinguished Service Order

Capt. Eric Mackay Murray, M.C., Q.V.O., Corps of Guides, I.A., and R.F.C. (Mesopotamia).—For conspicuous gallantry and devotion to duty during three months' operations. He persistently showed courage and ability of a high order throughout. He was three times in action against enemy aircraft, and on the last occasion returned with 20 bullet holes in his machine, after his passenger had emptied 1½ drums of ammunition from a Lewis gun at the adversary.

The Military Cross

Capt. John Overton Cone Orton, 2nd Battalion Norfolk Regiment, attached R.F.C. (Mesopotamia).—For conspicuous gallantry and devotion to duty during three months' operations. He showed splendid qualities as an observer and rendered most valuable service. His intimate knowledge of the country enabled his reports to be most accurate throughout. He was three times in action against enemy aircraft, and on the last occasion returned with 20 bullet holes in his machine, after 1½ drums of ammunition from a Lewis gun had been emptied at the adversary.

Medals for Brave Nurses

It was announced in a supplement to the *London Gazette* on November 25th that the King has been pleased to approve of the award of the Military Medal to the following ladies for exceptional courage and devotion to duty on the occasion of air raids on hospitals in the war zone:—

Miss Rosa Brain (S./Nurse), T.F.N.S.

Miss Evelyn M. Cridlan, F.A.N.Y.

Miss Mary Devas Marshall, F.A.N.Y.

Miss Christina Margaret Urquhart, F.A.N.Y.

and arrived at Damascus the same afternoon. Next day they started from Damascus at 7.25 a.m. and flew to Baghdad, which they reached at 3.30 p.m. on December 1st. In three days, the three countries, Egypt, Syria and Mesopotamia were visited, and the two great Asiatic Expeditionary Forces were linked up.

THE TWO FUTURES FOR FLIGHT

By H. MASSAC BUIST

(Concluded from page 1354)

The Inestimable Value of the Private Airman

ALL facilities under this head should be granted also to those sportsmen who will now be availing themselves of opportunities of flying their own machines about the country. That hobby must be made as cheap as possible and encouraged in every way; it must never be restricted unnecessarily. It is a mode of travel that does not put the community to any charges. Not even a road is the worse for wear and tear. As for any damage done by involuntary landings, and so forth, that, of course, is always paid by way of insurance.

It is the interest of a community of seafaring people who find themselves no longer an island nation to develop by any and every means their inborn aptitude for navigation by exploiting the new and enormously swifter phase of it that has come so suddenly with the dawn of the twentieth century. The importance of aviation alike in the matter of national defence and of civilian inter-communication is such as to ensure that at an early date after the proclamation of peace the question of laws governing the air will be dealt with not, happily, in the prejudicial spirit in which motoring was mishandled in these islands. In the case of flight the nation has realised that this new facility is no Juggernaut or selfish form of sport, but something that in time of war can save the lives of infantrymen by the million. As hunting is to the cavalryman, so is civilian flying to the Air Services. Consequently, not even a half-educated and deliberately misled democracy has in mind any form of legislation that will prejudice the freest possible development of aircraft and the use of them; the danger threatened is from bureaucracy, not democracy. The gradual perfection of mechanism from the point of view of reliability, increased radius of action, standardisation of achievement, multiplicity of experience, the gain of the necessary skill in production on the part of thousands, vast increases in productive capacity and the willing support of the public are among the great advances achieved during a war for civilisation. Indeed, it is probable that in no phase have we made strides as a result of this world conflict equally useful compared with those achieved in the matter of flight. There is no gainsaying that, but for this War, to-day we should merely be at the stage of regarding it as a very costly and dangerous form of sport; whereas the campaign has taught the man in the street that the maintenance of our aerial efficiency is a matter of vital and growing importance. We cannot write of anything in the guise of aerial supremacy, since no nation possesses that, and probably no one nation ever will. We must not see to it merely that nothing occurs to prejudice the freest possible development of flight; we must, besides, take steps deliberately to encourage its growth and establishment.

The Initial Scope for Goods Carriage by Air

By means of Government postal services, doubtless the necessary number of pilots will always be available for national defence work. The development of what we trust will always be individual enterprise, though it be mainly of the collective sort, in the matters of passenger and even transport services, will enormously supplement such resources. When one writes of transport service apart from passenger work, it must be had in mind that many commodities are of small compass and light relative to their money value, and that sometimes such things are needed speedily. Hence there is much more opportunity than many might imagine for goods carriage in retail by air. Thus, if parcel prices for aerial delivery were charged at the same rate per lb. of a man's weight as is represented by the fare for a passage by air from a given point to another, there would develop speedily a notable amount of profitable conveyance business, particularly as the maintenance of schedule aerial passenger services will involve such necessary accessories as car services to and from the main aerodromes. You cannot alight in the centre of Birmingham, Manchester, or Glasgow, far less of London. Nor is it likely that fliers will be able to do so for a matter of years. That the thing will become practicable in the fullness of time is as certain as that night follows day. In the mean season the road vehicles that will be available, let us say, at Hendon for London, at Sydenham for the south, and so on, will be equally capable of transporting such parcels as are sent by the given flying machine in the room of passengers for speedy transport at rates which we propose to be worked out at the equivalent of passenger fares where urgency of delivery is everything, as in the matter of medical equipment, articles of special diet, and so forth. Why should one not order clothes,

and, indeed, anything personal needed urgently, to be sent by aerial transport linking up two centres following receipt of a telegram or a telephone message? Assuredly, there is much more in the prospects of this sort than is yet realised either by the public or by those concerned with aircraft public service schemes. The matter might be elaborated by citing a hundred and one examples did space allow. To possess a facility new is speedily to develop a variety of ways of using it.

Grounds where Land is least Valuable

But we know that if satisfactory arrangements are to be made we must have, besides, intermediate depôts at distances certainly not exceeding ten miles apart as far as main route aerial journeys are concerned. This is easier than might appear in that, by contrast with every other form of travel development, a feature of the aerial proposition at the moment is that you must choose your ground precisely *where it is least valuable*. Thus you must have it well away from towns and even villages—in other words thoroughly in the open; the effort relatively little capital is needed since spaces suitable for military aerodromes will seldom be those most fit for public flying services.

It is not even necessary that such grounds should be Government property, or the property of the companies actually running any given aerial service. On the contrary, the Government would find it best to arrange subsidies in such centres as may be used on occasion by aircraft engaged on Government business either in peace or war. If every ground were the property of one aerial transport company, as the use of public aerial transport developed there would be all sorts of restrictions, troubles and waste of money over endeavouring to arrange terms by which rival companies might use other companies' grounds. In the issue there would be wastage and overlapping through each company having to set up a separate series of landing grounds. It is, therefore, in the interest alike of the public travelling by air and of the aircraft industry that any tendency of this sort should be nipped in the bud. That one is not merely imagining a problem is sufficiently clear to anyone who will go to the pains of studying how our railways came into being, and how money was wasted in connection with their establishment, alike at the inception of the movement and for generations after it had come to a great development.

The Initial and the Ultimate Means of Power

Irrespective of what arrangements are made in the matter of setting up aircraft centres—the outgoing Government has certain ideas that will be discussed anon—it should be had in mind that, in an age when the problem of creating fresh sources of employment is a very urgent one, here is an opportunity the value of which can scarcely be estimated. We know that in the immediately preceding development, the motoring movement, scores of thousands earned a livelihood in peace time in local garages, repair shops, and such like establishments. So in connection with the coming of aircraft. We want aircraft used daily by the thousand in these islands; in other words, in much greater numbers than British machines have been used in the War. That, incidentally, is a reminder of the vast additional demands that are bound to be made on the world's supplies of motor fuels in the next few years. It will be long before we shall come to the real solution of the flying machine problem by being able to dispense with the liquid fuel internal combustion engine, or other form of power plant carried on board the machine, and, instead, draw electric current by wireless through short, rigid antennæ. Undoubtedly, that will be done in the end, thereby solving at a stroke the great problem of having both to lift the power plant and to carry fuel and lubricant supplies for it, representing by far the greater proportion of the total load of the given machine and calling, besides, for the construction of much more costly and bigger machines than would be necessary for the useful loads carried.

In the mean season there is no occasion to be disheartened, as one may appreciate from a glance at the situation in regard to aerial navigation before the War and as it is to-day. Briefly, apart from having gained much experience resulting in the widespread entertainment of confidence and competence in the maintenance and handling of aircraft, the big difference is that before the War we had barely enough power for our machines to do their normal flying, whereas the power plant now available—individual aircraft engines can be and are built to-day of 800 and more h.p., nor is that near the limit

possible in the not distant future—provides a handsome margin beyond the requirements of normal flight. Of course, as long as machines were used in battle areas, and so forth, generally each started loaded with the maximum its wing surface and its engine, or engines, were capable of lifting. Thus a bomber aimed obviously either to damage the enemy at the maximum range possible, or to carry as many missiles as possible for operating over the chosen area. The aim with a reconnaissance machine was to have fuel supplies for the longest patrols and so forth.

The Secret of the Safety of Civilian Aerial Transport

When machines are adapted to civilian uses the case is altered. Thus, an aircraft service between London and Glasgow will probably embrace halts at Birmingham and Manchester. With emergency intermediate grounds there will be opportunities in plenty for replenishing fuel *en route* though with the margin of power now available it is extremely unlikely that descents will be more frequent than are needed to set down and take up passengers. The point is, it is not necessary to expend all your horse-power to engage your machine in ordinary work. Therein lies the secret of the safety of flight for civilian service. To-day we can construct so that proportionately great margins of horse-power are available per machine, thereby enabling such to encounter vastly more strenuous aerial conditions than could be mastered before the War without running undue risks. Of course, no aerial passenger service will be a thing possible to fly with the regularity, let us say, of railways or even of steamship services. In all probability for a term of years, at least, the problems of starting and alighting in fogs, and even of navigating from point to point under such conditions, will remain unsolved. This, however, is of little importance, since perhaps the oldest form of travel by other means than using one's own legs, or riding—I refer to voyaging on the surface of the water—is such that if one goes into Charing Cross railway station any day under peace conditions one may read a notice as to the condition of the sea. A vast proportion of our fellows who have to make short sea journeys do not always undertake them on the days they propose. On the contrary, they admit themselves absolutely at the mercy of the elements. How often has one been on a very full train starting from London, yet discovered that scarcely more than 25 per cent. of the passengers booked for France have stepped on board the boat at Dover or Folkestone, the balance putting up at hotels until the sea has calmed. Indeed, so frequent is the practice that it has paid commercial enterprise to establish at least one large hotel in a situation specially to cater for travellers in such case. Therefore, when one reflects how relatively few days of the year there are in which it is too foggy to alight safely on any of the big centres likely to be used for main line aerial passenger services, one realises that such occasional drawbacks will not in any wise prejudice the speedy development and full use by the public of the new time-saving mode of travel, which is, besides, an exceedingly healthy one. On those long-distance journeys high flying as we understand it in war work will be neither called for nor practised.

British Air Services for Britishers the World Over

In regard to such aerial services between one country and another as has been lately proposed by Mr. G. Holt Thomas, himself an exploiter of internationalism in aircraft matters from the inception of the movement—indeed, up to the outbreak of the War he was never associated with any other form of enterprise than reproducing foreign designs with British hands—it by no means follows that such services must be regarded as having necessarily to be international in composition, as for example those which will surely be established between London and Paris, London and Rome, London and Norway, and so forth. British built and owned steamship services ride the main to and from every point of the compass.

That there will be some internationally owned aerial services—by which one means that the capital interests will be taken out in part in one country concerned and partly in another—is assured; but that the actual equipment used will always be made in part in one country and partly in another is certainly by no means pre-ordained. Apart from the Holt Thomas enterprises, we may look for sound work in the matter of establishing public passenger services to be done in the not distant future by biplanes produced entirely by Handley-Page and engined by British firms; or again, by seaplanes entirely designed and built by Short Brothers, and similarly engined, to take as examples but two of the firms whose work stands for all that is sound and desirable in aircraft development and production. For what one may style international aircraft service, obviously

the keynote should be nationalism. British owned aerial service companies using British designed and British built aircraft for flight in Britain or in any friendly country should be encouraged alike by our Government and our public. That way only can we establish and maintain the large scale industry essential to the safety of the Empire.

Air Services not Limited to Densely Peopled Areas

We may go even further. Plainly, so far we have been discussing the relatively densely populated districts of Europe; but areas so thickly peopled are by no means the only ones in which really profitable use can be made of aircraft. On the contrary, if one looks through the pages of "FLIGHT" ten and eleven years ago, I note we are only on the threshold of fulfilling one of my forecasts; namely, that the employment of aircraft will prove absolutely invaluable not merely for postal and passenger services, but for policing and other guess public work in vast areas of countries like Australia, Canada, South Africa, and so forth. There one man, for example, would be able to do the amount of policing or patrolling that fifty men would be required to do equally effectively by means of horses or motor cars. In this connection, we must have in mind that the War has given a tremendous impetus to the rate at which the vast areas controlled by white men overseas must be developed. Taxation schemes, health risks, employment troubles, and so forth, must tend to accelerate to an unprecedented extent the tendency of the British to emigrate to distant lands. Moreover, now that the U-boat menace is overpast, by reflex action we begin to get a vast benefit from that enterprise, which caused the speeding up of the world's shipping to a fabulous extent. In a year or so there will be no lack of shipping facilities for taking men and women abroad. On the contrary, competition to this end will be extraordinarily keen, and prices will rule accordingly. Those who would go abroad will find presently that the best chances for them will come by their taking part in the development of the at present unpeopled virgin spaces of our Dominions overseas, since the Governments of each are already educated to the urgent need to prevent further concentration in towns. The wealth of our Dominions overseas lies in peopling and developing, not spots merely, but the whole of them. In the past development of this sort has hung fire for lack of numbers, of roads and of railways. Progress has depended on the degree to which it has been possible to build roads or railways. Here is precisely where the flying machine comes to the rescue. Vast capital is not needed to establish satisfactory flying services in sparsely peopled areas. Nor need any one public flying service depend on great numbers of people being in the need of rapid facilities for travel, such as folk must be assured of before they can start building a railway. With less money than will build a road of hundreds of miles you can link two points so far apart either by a daily, bi-weekly or a weekly aircraft service involving an outlay of a few thousand pounds only. By adopting radial schemes from a given centre, anything up to seven others, each at a different point of the compass, could be served by the equipment sufficient for one daily service! Alike in Europe and abroad this type of aerial service will prove one of the great instruments of accomplishing the work of decentralisation which will be found to be a feature of the second quarter of the Twentieth Century development the world over. It is called for no less insistently in Australia, Canada, South Africa and India than at home.

All's Well—If Wise Counsels Prevail!

Therefore, whichever way we look at the matter, there are grounds for realising that, if the proper sort of enterprise is forthcoming; if the Government will exercise the only sort of control desirable by stepping between the public and the unscrupulous company promoter who sees in flight merely the latest means of swindling the public and thereby stabbing the movement, and if the Government to be elected will assist enterprise by wise subsidies, the future of British flying is bright, and vastly more promising than any intelligent enthusiast would have dared to anticipate a matter of only four and a quarter years ago.

I cannot agree with those who hold that the flying industry will be ruined if war orders cease. On the contrary, if the Government will play its due part, the "change over," should be a chief opportunity for the industry. It will prove so as far as concerns those firms in the industry which are conducted with foresight and knowledge as well as enterprise. That the weak members will be weeded out is no harm, for the present manufacturing resources in these islands are necessarily so large that it is right the law of the survival of the fit only should begin to operate. All we want in Britain is quality aircraft and airmanship, since our

sound designers and our firms of sufficient productive skill are already appreciably numerous, constituting collectively a very important industry which would only be handicapped by the Government establishing an artificial state of affairs, as by indiscriminately encouraging firms to lead more or less easy existences at the charges of, shall we say, the taxpayer. We want the best, and nothing but the best. Moreover, we have enough of the best in this country to leave no manner of doubt as to the brilliant future ahead of the movement unless our next Government deliberately mars it. That the Flying Services must be cut down at least as regards the scale they were planned to attain in 1919 is alike obvious on national financial grounds and practical on economical ones. Plainly, the interests of the public demand that only physically and mentally fit airmen should gain a livelihood by what may be called commercial flying. The Government should have the necessary control over such members of the community as can be achieved alone by ruling that all pilots for public flying services must be on the Reserve of the Royal Air Force.

The Sound Phases of the New Policy

The scheme had in mind at the moment is that airmen for future public services must go through a period of training, possibly of as much as a year's duration, before each will receive his certificate for such work. The training in question would embrace practically all that it is needful for an airman to know for military service, therefore ensuring, incidentally, that sense of individual responsibility which it is in the interests of the community at large should be guaranteed in the case of such an utterly unprecedented, romantic and suddenly achieved stage of progress as is represented by the coming of commercial flying. This War has proved that we want enormous reserves of properly trained airmen, in that future campaigns will be conducted much more actively, will be fought out much more quickly, and will employ quite different proportions of the various arms to those used in what may be styled the transitional type of warfare through which we have just passed. Far more airmen will be employed in relation to bayonets than in this campaign. But we cannot keep a standing air force on any such scale. Apart from the mere cost of the men is the great expense of the vehicles they must fly more or less continuously if they are to be "fighting fit." One sees every gain, therefore, in the establishment of such Government control as will effectively prevent the development of anything so intolerable and prejudicial as, shall we style it, air hogging. In like fashion, as the Board of Trade's function is to lay down certain regulations concerning safe shipping, so it is reasonable that a Government Department should exercise a certain control over the types of flying machines used for public aerial transport services.

Theoretically, and without reflection, it sounds an excellent idea that all flying machines for civilian purposes should be passed by members of the Aeronautical Inspection Department. While praiseworthy in certain connections, assuredly during the War its work has not been beyond the scope of fair criticism.

And Unsound Ones

For the Technical Department of our Air Board to continue its functions and to enlarge its sphere by controlling aircraft matters as regards interfering with aircraft designs for public and private aerial services, as distinct from Government ones, is a proposition entertained by the outgoing Government, and, of course, whole-heartedly approved by the Department in question, but concerning the advisability of which it is the duty of the individual citizen to reflect very seriously. In effect, the notion is that, backed by the much vaunted Government experimental work, and so forth, the self-acclaimed wonderful Technical Department of the Air Board is to make all for the best in anything but an ideal world. When it comes to the proposed extension of the scope of this Department, it is one's duty to put the question point blank: What is the story either of the work it has accomplished, or, more particularly, of the work achieved by any of the individuals composing its staff, including alike prominent and obscure ones? Granted a certain amount of Government experimental work has contributed to the evolution of aircraft in this detail or that, even as has individual or commercial investigation, as instance the lead given by this, that and the other firm both during and before the War. The point is precisely that which one argued when the abominable pre-War system of the Royal Aircraft Factory obtained at South Farnborough and was rapidly ruining our aerial chances; if the British taxpayer were to spend one hundred thousand, or one hundred million pounds a year on the establishment of any such Government Department to do the experimental work, still that Department could not secure

the services of all the brains, nor the fruits of all the experiments that can be carried out yearly throughout the length and breadth of the land by all the aircraft enterprise collectively. There has been done a certain amount of profitable experimental work, including varieties too costly for firms on a commercial basis to undertake. The whole spirit and method in which this fruit has been used to date must be altered. When it comes to aircraft engines, of course, it were fatal for the Government to attempt to control the utterly free evolution of these. In other words, the Technical Department's legitimate function in the period now opening is to concern itself with equipment for the Royal Air Force, or for the Government aerial post and other services. Beyond that it should be powerless to interfere in any way. It is all very well to argue that it is necessary to stop any freak inventor having his will at the expense of the public. No such condition of affairs could be prevented effectively by the Technical Department of the Air Board. It has done many an absurd thing during the war, and will do many unsound ones hereafter. If it were put in charge in the manner that has been insinuated under cover of the allegation that our Dominions overseas are requesting, in effect, the establishment of Bureaucracy in aerial matters in Britain, there is no gainsaying that many a valuable development to the movement would be quashed at the outset. *There must be absolutely free scope for development and the application by individuals, or companies, of aircraft and power plant schemes, whether the particular group of officials employed by the Technical or any other Department of the Air Board approves them or not.* Who can pretend for a moment that any group of men, no matter how selected, is qualified to exercise a veto on the destinies of aviation development in these islands? The United States of America, France, Italy, even Germany, will not embark on any such suicidal policy. Neither must we tolerate anything in that strain.

Make Every Parliamentary Candidate Pledge Himself

One writes this at this juncture of set purpose. The game of bureaucracy is afoot. It is the greatest incubus that threatens this country to-day and in the years to come. We have carefully reviewed the fair prospects for the fullest flying development in the Empire, of course on the assumption that alike fettering and undesirable practices on the part of individuals, corporations, or Government Departments will not be exploited. Yet another of the aims is that all landing grounds worth the having, even for civilian as distinct from military use, should be Government owned. It is even bruited that everything in the nature of international aerial services, if not internal ones, is to be owned, in effect, by the Government, hence the cover under which the Technical Section would become supreme. The initiative of designers and producers would decline in measure with the increase of activities of that Department in the direction indicated. All this is very different to the proposition that every machine to be flown must have a pilot trained by the Government for twelve months. That idea is sound, even as is the one to the effect that every machine to be flown in public service must be certified by the A.I.D. as to its soundness; but we must strive with might and main to save ourselves from the terrible threat of bureaucracy now arising. A few men only are needed to act on behalf of the Government in association with the industrial and commercial phases of flying apart from the Service phases; whereas we are threatened with the establishment of departments employing hundreds, if not thousands, of men. British genius does not lie in this direction. On the contrary, this is the thing that kills it. Our strength will develop in measure as we exploit individual enterprise. The omnipotence of the Technical Department of the Air Board, for the most part manned by what some have styled the "throw-outs" of the industry, and, in any case, practically not at all by men of notable achievement will cramp development and prove fatal whenever the next national emergency arises. It is scarcely conceivable that Lord Weir, quick to learn, can lend himself to Parliamentary trickery and the establishment of Bureaucracy. He comes of sound commercial engineering stock, and has succeeded because he did not scheme, but has worked. Whether he remains our future Air Minister, or whether we choose another one, it is essential that the head of the Service under the Government yet to be elected should be one able to withstand association with those conscienceless creatures, Bureaucrats, keeping his hands free of all schemes to throttle the fullest legitimate development of our national genius for individual enterprise. There is only one way out. All interested in flight must see to it that every candidate soliciting votes, no matter on what programme, is heckled and made to give publicly a pledge that, if returned, in the House of Commons he will actively oppose and

vote against any Government which proposes to jeopardise the future safety of these islands, and the future of aviation in them, by establishing a scheme of bureaucracy, one had in mind being even a greater menace than is indicated by the points I have sketched.

All those genuinely interested in aviation must put to their

Do you pledge yourself actively to oppose the establishment of a Bureaucracy in connection with the development of aviation alike for military, public and private purposes in these islands; and will you advocate limiting Government control in these matters to the mere assurance of the safety of the public and the maintenance of efficiency of the military aviation services, for the rest encouraging individual investigation, invention, constructional and flying enterprise freely and in every legitimate way possible?

That is the question of the hour with the flying world in this Empire. On the answer depends our future power and security.

SERVICE IN THE R.A.F.

In order to provide the airmen of oversea garrisons, and the necessary reserves at home, it has been decided that airmen may specially extend their Air Force service for periods of approximately two, three, and four years, respectively, from date of extension, the object being to obtain equal numbers in these three classes. The conditions under which service may be extended are now published, but no men will be accepted until further detailed instructions are sent.

The men eligible to extend their service are:—

(a) Men serving on "Duration of War" engagements.

(b) Men serving on normal engagements, whose term of Colour service has expired, or is due to expire, before April 1st, 1919.

Men will be required to extend their service:—

(a) To any date between January 1st, 1921, and June 30th, 1921.

(b) To any date between January 1st, 1922, and June 30th, 1922.

(c) To any date between January 1st, 1923, and June 30th, 1923.

The actual date of discharge in each individual case is to be determined, within the limits laid down above, by the Air Ministry, according to the requirements of the R.A.F. from time to time.

To qualify for extended service a man must be physically fit for service in his Air Force trade at home or abroad, and must not be over the age of 38 on extension of service.

Airmen who wish to extend their engagements, but for whom vacancies in the Peace Establishment, in their existing ranks, do not exist, may, subject to the conditions already stated, be allowed to extend their service in the lower ranks. In such cases the airman must sign a statement that he is willing to accept the lower rank and pay. The number of sergeants must necessarily be limited, as it must be in proportion to the number of rank and file extending. The number extending in any trade must be limited to the requirements of that trade. The number extending for each of the three periods of service must be approximately equal.

Pay and Bounties.—The present rates of pay and allowances for the Royal Air Force will continue in force for the period of extension of service, and the rates of pay for any airmen voluntarily continuing to serve after the termination of this extension will be the normal rates then in force. Men originally transferred from the Navy and Army (including the R.N.A.S. and the R.F.C.), who are in receipt of special emoluments as a vested right, will be granted the regulated pay and allowances of the R.A.F. rank only. Similarly, men enlisted at special rates of pay, for instance, drivers and clerks and ex-R.N.A.S. drivers in receipt of driving pay, will be offered the normal emoluments of their present rank only. All men promoted afterwards will come on to the then existing rate of pay appropriate to the rank. Service after the end of the war will not count for increased "war pay."

candidates the question point blank at a public meeting, take down the answer, making a note of the hour, day and place; who is in the chair; having the report signed by two witnesses, and sending it to the Editor of "FLIGHT," who will collect and publish a complete tabular list of the candidates pledged. The simple question should be:—

The rates of separation allowance now in force will be continued in the case of men in respect of whom they are now issuable.

In addition to any pension, reserve pay, or gratuities to which men may be entitled on account of war or other service, bounties at the following rates will be given to men extending their service, provided they so extend their service before January 1st, 1919, in the case of units at home and with the B.E.F.; February 1st in the case of units in the Middle East, the Mediterranean, Canada and America; and March 1st, 1919, in the case of units in Mesopotamia and India.

£20 Bounty.—Men extending to any date between January 1st, 1921, and June 30th, 1921, three sums each of £6 13s. 4d.—the first payment on extension of service, the second on completion of first year, and the third on completion of second year or on discharge.

£40 Bounty.—Men extending to any date between January 1st, 1922, and June 30th, 1922, four sums each of £10—the first payment on extension of service, the second on completion of first year, the third on completion of second year, and the fourth on completion of third year or on discharge.

£50 Bounty.—Men extending to any date between January 1st, 1923, and June 30th, 1923, five sums each of £10—the first payment on extension of service, the second on completion of first year, the third on completion of second year, the fourth on completion of third year, and the fifth on completion of fourth year or on discharge.

Special Leave.—Special leave to the United Kingdom will be granted as follows:—

Two months.—Men extending to any date between January 1st, 1921, and June 30th, 1921.

Three months.—Men extending to any date between January 1st, 1922, and June 30th, 1922.

Three Months.—Men extending to any date between January 1st, 1923, and June 30th, 1923.

This leave will be given as soon after extension of service as the exigencies of the service permit, but in the case of men going to oversea garrisons it will be given in any circumstances before they proceed to such garrisons.

Preference will be given to single men without dependents, or with dependents drawing low rates of allowance. Consideration may be given to the applications of other men, but passages to and from foreign garrisons will only be granted to a limited number of families. In the case of married men, the present rates of separation allowance, when otherwise admissible, can be guaranteed only to the families of such men as are married at the date of the Order (November 30th). The privilege of passage for a family cannot be commuted for a money bounty.

In the case of men extending for 12 years, under letter and Memorandum C. 56556 of November 19th, a bounty of £50 will be paid, and the terms of service will be as in this Order, for four years. Afterwards ordinary R.A.F. Regulations will apply.

R.A.F. Casualties—7,589 since last April

THE Secretary to the Air Ministry issues the following statement of the casualties to officers and men of the Royal Air Force from April 1st, 1918 (the date of the establishment of the Force), up to November 11th, 1918:—

The casualties of the Royal Naval Air Service and the Royal Flying Corps from the outbreak of War up to April 1st, 1918, the date of the amalgamation of the two Services, have been included in the figures already published by the Admiralty and War Office respectively. These casualties will, however, be published separately as soon as they can be extracted, in order that the total casualties of the Flying Services during the War may be on record:—

	Officers. Other ranks.	
Killed (including training casualties, died from wounds, and died from other causes)	1,551	1,129
Wounded	2,357	631
Missing (including prisoners)	1,612	225
Interned	45	39
Totals	5,565	2,024
Grand total	7,589	

The numbers shown above as "missing" include 377 officers and 66 ranks who have been reported to have been taken prisoners.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE FLYING SERVICES FUND

(Registered under the War Charities Act, 1916)

Administered by the Royal Aero Club

For the benefit of *Officers, Non-Commissioned Officers and Men* of the ROYAL AIR FORCE who are incapacitated on Active Service, and for the Widows and Dependants of those who are killed.

Honorary Treasurer:

The Right Hon. LORD KINNAIRD.

Committee:

Lieut.-Col. T. O'B. HUBBARD, M.C., R.A.F. (*Chairman*).
Mr. CHESTER FOX.
Lieut.-Col. HARCOURT G. GOLD, R.A.F.
Lieut.-Col. C. E. MAUDE, R.A.F.
Colonel R. H. MORE, C.M.G., R.A.F.

Secretary:

Lieut.-Com. H. E. PERRIN, R.N.V.R

Bankers:

Messrs. BARCLAYS BANK, LTD., 4, Pall Mall East,
London, S.W. 1.

FLYING SERVICES FUND COMMITTEE

A MEETING of the Flying Services Fund Committee was held on Thursday last, November 28th, 1918, when there were present:—Lieut.-Col. T. O'B. Hubbard, R.A.F., in the Chair, Mr. Chester Fox, Lieut.-Col. H. G. Gold, R.A.F., and Lieut.-Com. H. E. Perrin, R.N.V.R., Secretary.

Grants and Allowances.—The following Grants and Allowances were made:—

(32) A grant of £10 to the widow of an Ex-1st Class Air-Mechanic in the Royal Flying Corps who had died as result of exposure whilst on active service.

(35) An allowance of £4 a month for six months to the father of a 1st Class Air-Mechanic in the Royal Flying Corps who had been killed on active service.

(106) An allowance of £2 a month for six months to the

widow of a 3rd Class Air-Mechanic in the Royal Flying Corps who had been killed on active service.

(76) An allowance of £3 a month for six months to the father of a Corporal in the Royal Flying Corps who had been accidentally killed on active service.

(118) An allowance of £4 a month for six months to the mother of a 3rd Class Air-Mechanic in the Royal Air Force who had been killed on active service.

(117) A grant of £50 to the father of a Captain in the Royal Flying Corps who had been accidentally killed on active service.

(118) An allowance of £6 a month for six months to the widow of a Sergeant in the Royal Flying Corps who had died on active service.

(47) An allowance of £4 a month for six months to the widow of a Corporal in the Royal Flying Corps who had been killed on active service.

(121) An allowance of £2 a month for six months to the widow of a 2nd Class Air-Mechanic in the Royal Flying Corps who had died on active service.

(122) An allowance of £5 a month for six months to the widow of a 2nd Class Air-Mechanic in the Royal Flying Corps who had been killed on active service.

Subscriptions

	£	s.	d.
Total subscriptions received to Nov. 26th, 1918	13,918	17	11
Staff and Workpeople of Messrs. Thos. Firth and Sons, Ltd., and their National Projectile Factory at Templeborough	50	0	0
Miss Molly Robeson	0	2	0
C. H. Alderson	2	2	0
Net proceeds of a Dance held by the N.C.Os. and Men of No. 198 (N.) Training Squadron, Royal Air Force, Rochford	23	2	6
Total, December 3rd, 1918	13,994	4	5

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

Back from Germany

THE following officers, who were prisoners in Germany, have been released, and have arrived in England:—

Lieut. H. L. C. Aked, W. Yorks R., attd. R.F.C.
Lieut. E. H. E. J. Alexander, K.O.Y.L.I., attd. R.F.C.
Capt. P. A. Broder, Worc. R., attd. R.F.C.
Sec. Lieut. C. H. Brown, R.F.C.
Sec. Lieut. W. A. S. Brown, Arg. and Suthd. Highrs., attd. R.F.C.
Lieut. A. I. Burnie, Buffs (E. Kent R.), attd. R.F.C.
Lieut. A. Cairnduff, R.F.C.
Lieut. J. S. Castle, R.F.C.
Lieut. H. Clements-Finnerty, Lancers, attd. R.F.C.
Lieut. W. M. Crabbie, R.F.A., attd. R.F.C.
Capt. D. S. K. Crosbie, Arg. and Suthd. Highrs., attd. R.F.C.
Capt. D. W. Davis, Sask. R., attd. R.A.F.
Capt. F. H. Eberli, R.G.A., attd. R.F.C.
Lieut. W. B. Ellis, A.S.C., attd. R.F.C.
Capt. G. C. Formilli, R.G.A., attd. R.F.C.
Capt. F. E. Fryer, R.G.A., attd. R.F.C.
Lieut. C. Geen, London R., attd. R.F.C.
Sec. Lieut. A. R. L. Goodson, Lond. R., attd. R.F.C.
Lieut. V. M. Grantham, R.F.C.
Capt. K. W. Gray, Wilts R., attd. R.F.C.
Lieut. M. W. Greenhow, W. Yorks R., attd. R.F.C.
Lieut. R. T. Griffin, R.F.C.
Lieut. C. D. Griffiths, R. Welsh Fus., attd. R.F.C.
Lieut. D. Grinnell Milne, R. Fus., attd. R.F.C.
Lieut. E. A. Halford, Wilts R., attd. R.F.C.
Lieut. E. B. Harvey, London R., attd. R.F.C.
Lieut. B. P. G. Hunt, Yeo., attd. R.F.C.
Capt. R. E. B. Hunt, Shrops. L.I., attd. R.F.C.
Capt. W. W. Jefferd, Middlx. R., attd. R.F.C.
Lieut. H. J. Kemp, Ches. R., attd. R.F.C.
Capt. C. C. Knight, R.F.C.

Capt. J. C. Leech, Hussars, attd. R.F.C.
Capt. D. Leeson, Brit. Col. R., attd. R.A.F.
Lieut. O. Lerwill, R.F.C.
Capt. V. S. E. Lindop, Leins. R., attd. R.F.C.
Lieut. H. O. Long, R.E., attd. R.F.C.
Lieut. O. Mansell Moullin, R.F.C.
Lieut. G. E. Maxwell, R.F.C.
Lieut. J. G. McEwen, R.F.C.
Lieut. W. C. Mortimer Phelan, R.F.C.
Capt. R. W. Nichol, R.F.C.
Lieut. V. G. Odling, R. Berks. R., attd. R.F.C.
Lieut. L. J. Pearson, R.E., attd. R.F.C.
Capt. G. T. Porter, R.G.A., attd. R.F.C.
Lieut. A. L. Russell, R.F.C.
Capt. S. A. Sanford, Dragoon Gds., attd. R.F.C.
Lieut. E. R. C. Scholefield, Lan. Fus., attd. R.F.C.
Lieut. R. J. Slade, A.S.C., attd. R.F.C.
Lieut. W. E. Somervell, L.N. Lancs R., attd. R.F.C.
Capt. N. C. Spratt, R.F.C.
Lieut. H. B. Stubbs, R.F.C.
Lieut. W. O. T. Tudor Hart, M.C., R.F.C.
Lieut. C. I. Van Nostrand, R.F.C.
Capt. A. G. Weir, R.F.C.
Lieut. B. O. Wilkin, D. of Corn. L.I., attd. R.F.C.
Capt. C. B. Wilson, M.C., Hrs., attd. R.F.C.

From Austria

The following officers, who were prisoners in Austria, have been released:—

Lieut. G. N. Goldie, R.F.C.
Sec. Lieut. F. D. C. Gore, R.F.C.
Lieut. L. B. May, R.F.C.

From Turkey

The following officer who was a prisoner in Turkey has been released:—

Capt. S. C. W. Smith, E. Surrey R., attd. R.F.C.

NOTES ON GERMAN BOMBERS THE FIVE-ENGINED GIANT

[Issued by Technical Department (Aircraft Production), Ministry of Munitions.]

(Concluded from page 1347.)

A FIVE-ENGINED bomber was brought down near Talmas on August 10th, but unfortunately, owing to the explosion of

one of its bombs, the machine was damaged beyond hope of reconstruction.

Some of its components have been recovered, and of these photographs are given in Figs. 67 to 82.

The principal item of interest is the gear box, which is used for all five engines, each of which is a 300 h.p. Maybach of the standard 6-cylinder vertical type.

The power plants are arranged as follows:—In the nose of the machine is one engine driving a tractor screw. On each side of the fuselage, supported by the wings, is a long pair of engine bearers carrying two engines apiece, which drive tractor and pusher screws in a manner exactly similar to that set forth in Fig. 46.

The use of the gear box and driving shafts necessitates the employment of a fly wheel on the engine, to which is added the female portion of a flexible coupling of the type already described.

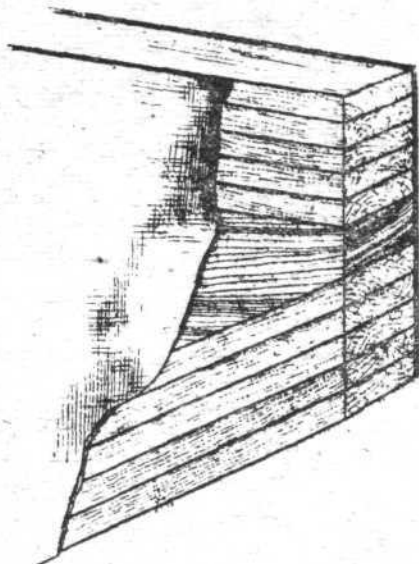


Fig. 65.—Engine bearers of five-engined bomber.

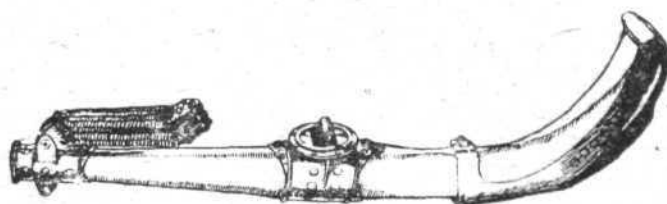
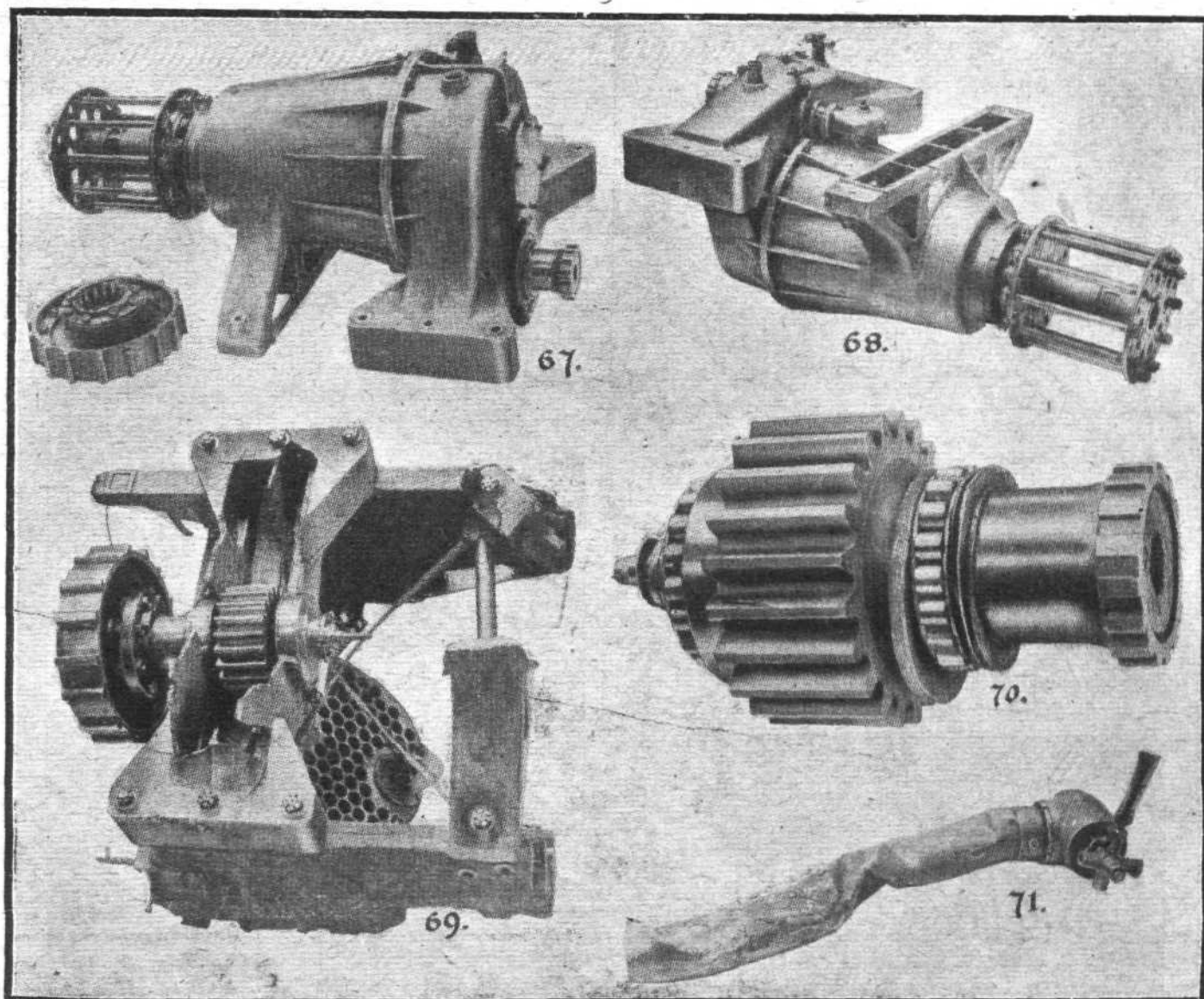


Fig. 66.—Tail skid of five-engined type.



Some constructional details of the five-engined giant.—67. Long gear box, complete with male clutch. 68. Long gear box seen from underside. 69. Broken gear box (long type), with bearers and oil radiator. 70. Driving pinion. 71. Windmill.

Whereas the gear box in the four-engined giant, of which notes have already been given in this report, is of a somewhat crude type employing external driving shafts between the gear box and the engine, in the five-engined machine the gear-box design is considerably improved. The casing con-

In each case the gear reduction is 21-41. Plain spur pinions are used having a pitch of 22 mm. and a width across the teeth of 75 mm. The diameter of the smaller of the driving pinions is 162.5 mm., and that of the larger pinion 282 mm.

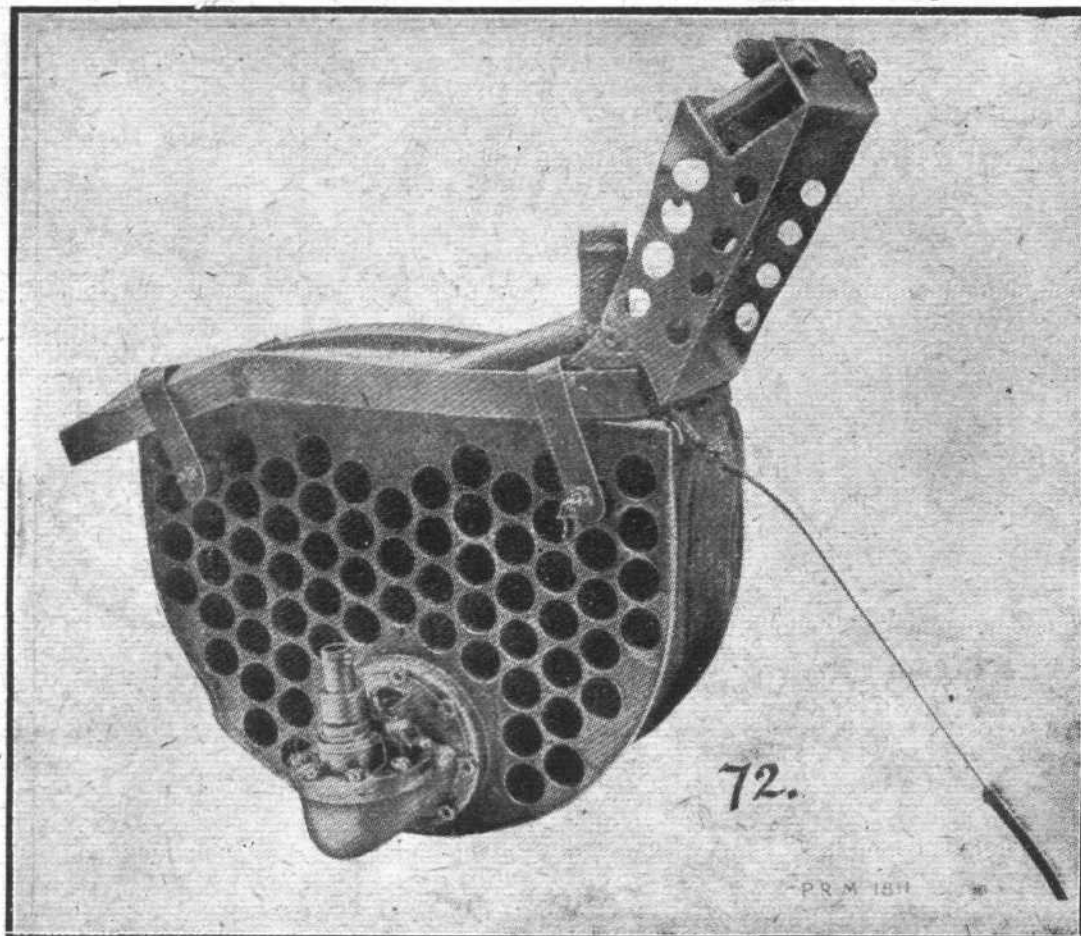


Fig. 72.—Oil radiator and gear pump of five-engined giant.

sists, as shown in photograph No. 67, of a massive aluminium casting provided with four feet which are bolted to the engine bearers.

Two kinds of gear boxes are employed. These differ only in over-all dimensions and the length of the propeller shaft.

The larger type is used for the pusher screw in order to obviate the necessity of cutting a slice out of the trailing edge of the main planes.

All the gear boxes were very badly damaged except that which is shown in Fig. 67. This is the longer type, but it would appear that the shorter design is very similar in appearance.

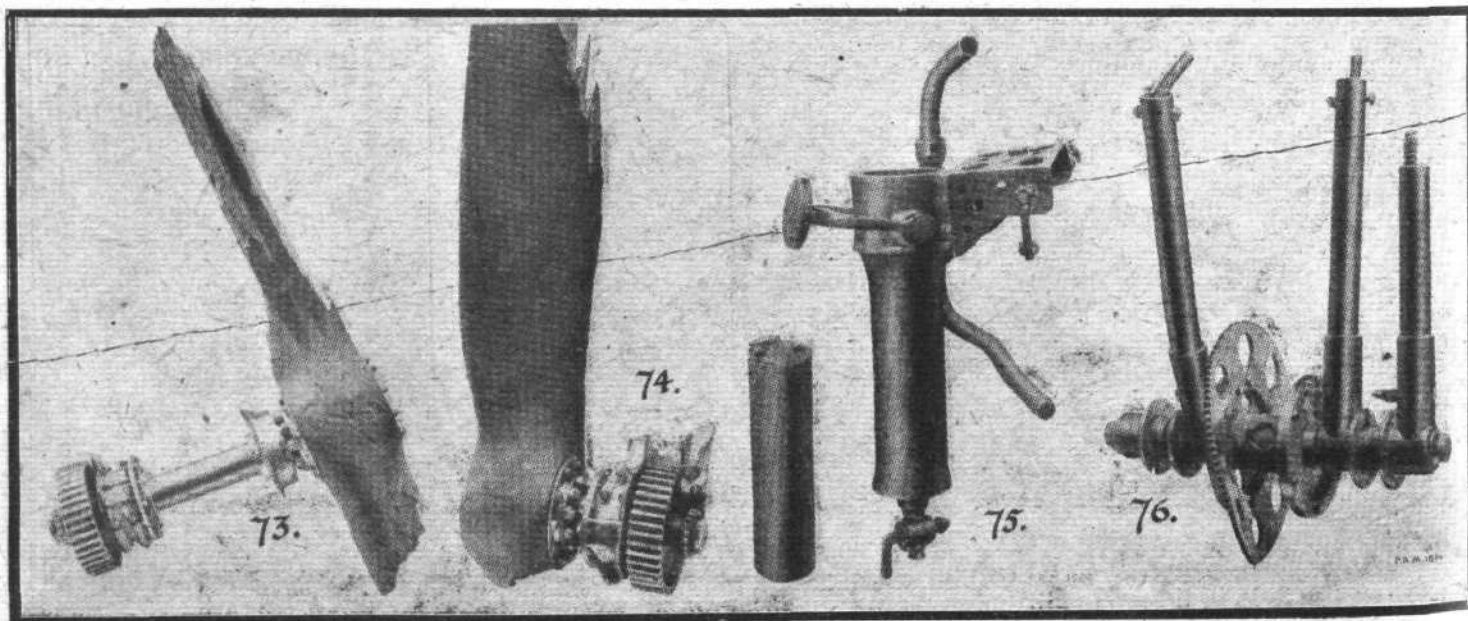
The larger pinion is as shown in Fig. 73, considerably dished, but the web is not lightened by any perforations.

The over-all dimensions of the gear box, as represented in Fig. 67, is as follows:—

Length, 1,025 mm.; breadth, 675 mm.; height, 535 mm.

The driving pinion runs on two large diameter roller bearings—carried in gunmetal housings supported in the inner end of the gear box. This part is split vertically, and united by the usual transverse bolts, whilst the conical-shaped portion of the box is solid. The usual oil-thrower rings of helical type are fitted.

At its outer end the pinion shaft terminates in a ring of



Some more details of five-engined giant.—73. Pusher screw and driven pinion. 74. Tractor screw and pinion. 75. Oil filter of gear box. 76. Engine control levers.

serrations which engage with serrations provided in the male portion of the flexible coupling, these two parts being held together with bolts and clamping plates. The engine is thus close up against the gear box, in contradistinction to the design of the four-engine power plant. There is practically no external shaft at all. The larger pinion is mounted on a hollow shaft of 92 mm. diameter, carried on roller bearings at each end for radial load, and furnished at the nose end with ball thrust bearings.

In the short type of gear box the larger pinion shaft is left solid, and it would appear that the gear box casing, instead of being made in three pieces, is made in two pieces, i.e., the whole box is simply split vertically.

Reference to photograph No. 68 will show that the smaller pinion shaft projects right through the gear box, and at its outer end carries a projection fitted with a small ball thrust race. This projection acts as a drive for the oil pump,

and embraces 65 tubes of approximately 20 mm. internal diameter. These are expanded and sweated into the end plates, to one of which is fitted a stout flange, against which is bolted a small gear pump which constantly circulates the oil from the gear box case through the radiator.

This gear pump is driven by a flexible shaft from the small pinion, the shaft and its casing being in all respects similar to those employed for engine revolution counters. As shown in the photograph, Fig. 68, which illustrates the complete gear box upside down, this flexible drive is taken off a small worm gear.

It will also be seen that underneath the oil sump of the gear box proper an electrical thermometer is fitted, which communicates with a dial on the dashboard.

It is a little difficult to see what object can be served by this thermometer, unless it be to indicate the desirability of throttling down a little in the event of the oil getting unduly

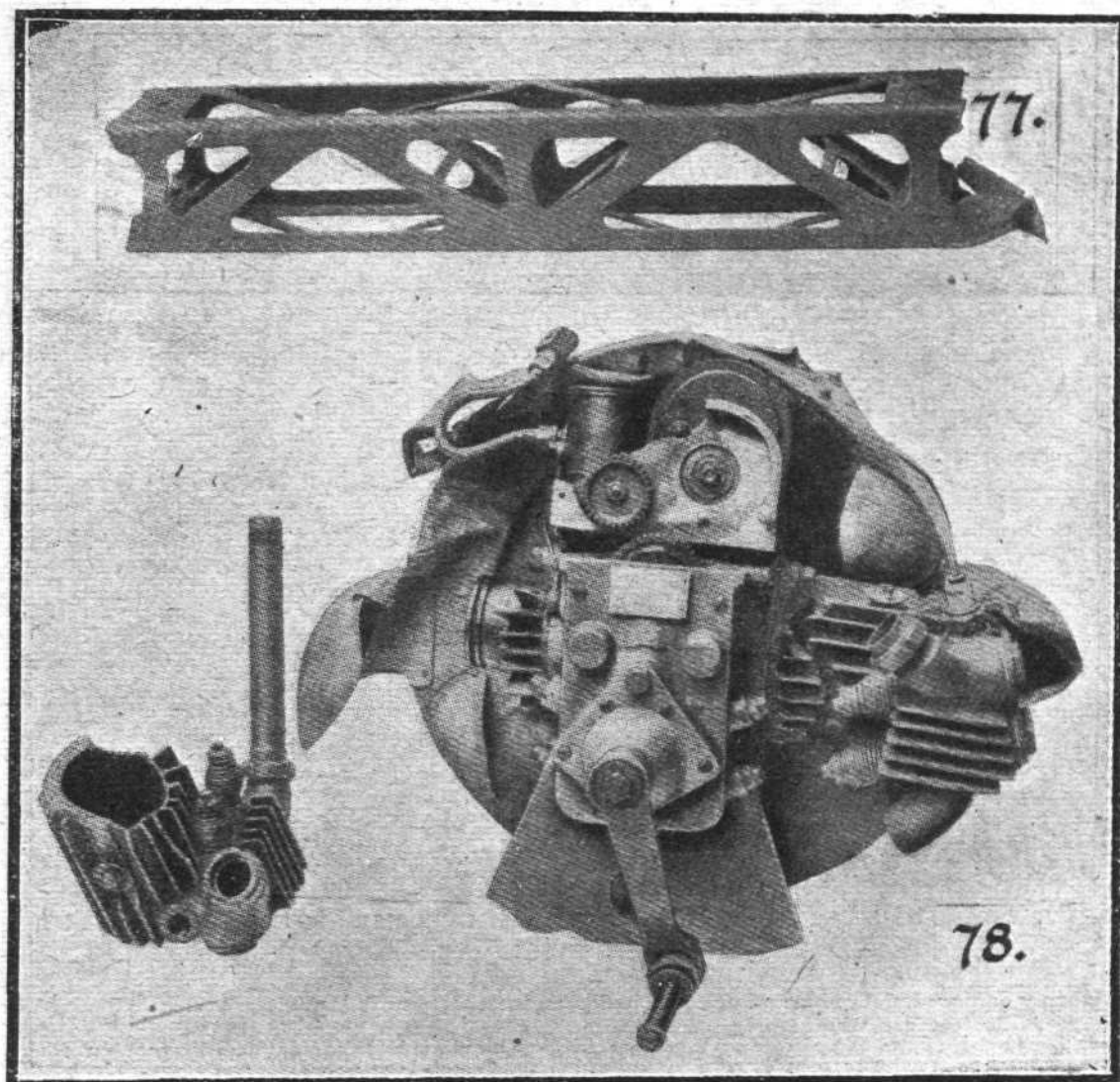


Fig. 77 shows engine bearer transverse girder. 78. "Douglas" type wireless and heating generator.

which is mounted on the oil radiator used in connection with each gear box.

It is worthy of notice that the German designers have now fully realised the importance of using geared engines for weight carrying aeroplanes, and are apparently satisfied with the external gear-box principle, although in this case they have made it a very ponderous affair indeed. Needless to say, a great amount of the weight could have been saved, if 12-cylinder engines had been used instead of 6-cylinder.

The weights of the gear box and its attachments are as follows:—

- Gear box, long type, 280 lbs.
- Fly wheel and female clutch, 44 lbs.
- Male clutch, 5 lbs.
- Oil radiator, 12½ lbs.

This, it will be seen, represents an additional weight of considerably more than 1 lb. per horse power.

The oil radiator used in conjunction with each gear box is of a roughly semi-circular shape, and is slung underneath the main transverse members of the engine bearers so that it comes immediately beneath the large feet of the gear box, as shown in Fig. 69. This radiator is entirely of steel con-

struction, and embraces 65 tubes of approximately 20 mm. internal diameter. These are expanded and sweated into the end plates, to one of which is fitted a stout flange, against which is bolted a small gear pump which constantly circulates the oil from the gear box case through the radiator.

Fitted on each gear box and working in connection with the oil circulation is a filter of the type shown in Fig. 75. This is provided with an aluminium case and a detachable gauze cylinder through which the oil passes.

The arrangement of the gear box is such that the axis of the propeller is raised about 220 mm. above that of the engine crankshaft.

The construction of the long engine bearers is not without interest, as amongst other things, it indicates that German manufacturers are finding themselves short of suitable timber. Each bearer, as shown in Fig. 65, consists of a spruce or pine central portion, to which are applied, top and bottom, five laminations of ash. On each side are glued panels of three-ply, about ½ in. thick.

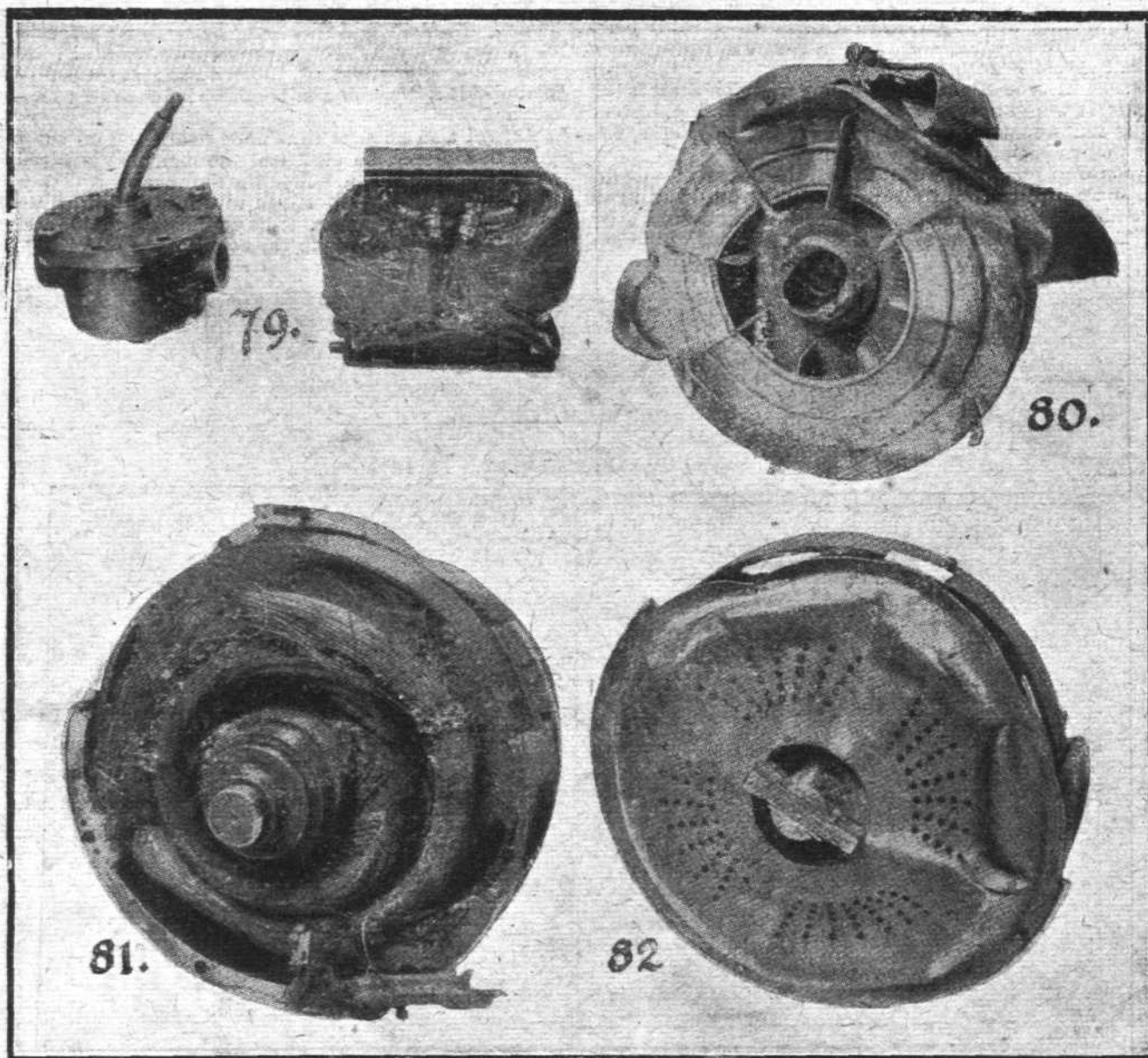
The engine bearers taper sharply at each end, and are strengthened by massive steel girders under each gear box. One of these girders, which is a single-piece welded construction, is illustrated in the photograph, Fig. 77.

The screws revolve at approximately half the speed of the engine, and having therefore a moderately light centrifugal

load to carry, are made of a common wood that would scarcely be safe for direct driving screws.

Although fitted to 300 h.p. Maybach engines, they are marked 260 p.s. (h.p.) Mercedes. The diameter is 4.30 meters and the pitch 3.30, for the pusher screw, but unfortunately,

A smaller fitting recovered from the wreckage is illustrated in photograph No. 71, and consists of a windmill of a type similar to that used on the D.H. 9 aeroplane. It is mounted at the top of an aluminium tube, but it is not possible to say for what purpose this mill is employed.



The five-engined giant.—79. Pump and transformer. 80. Rear view of engine and flywheel. 81. Wireless generator. 82. Cowling and dynamo drive.

owing to the propellers being badly damaged, not only by the crash, but by fire, it is not possible to state whether the tractor screws are of the same dimensions and pitch.

The construction is very interesting: each screw is made of 17 laminations of what appears to be soft pine, and these laminations are themselves in pieces, and do not run continuously from tip to tip. They are, of course, staggered, so that the joints in successive layers do not coincide. Two plies of very thin birch veneer are wrapped round the blades. The grain of this veneer runs across the blade instead of along it.

It is difficult to say from the appearance of the screw whether this veneer has been put on in the form of two-ply or as two separate layers, one after the other.

Among other details salvaged from the wreckage is the engine control. This is illustrated in photograph No. 76, and is a very massive affair. It consists of five stout steel tubular levers, two of which it will be noticed have become unbrazed in the fire which broke out when the machine crashed.

The levers are fitted with ratchets so that each one can be operated individually, but the presence of the large-diameter toothed wheel in the centre of the lever shaft would seem to indicate that all five levers could, when desired, be controlled simultaneously. This fitting had, however, been very badly fused, and it is impossible to give details with certainty.

A small and very heavy rotary pump, found in the wreckage is shown in photograph No. 71. This is possibly the hand-driven petrol pump, though it would appear unusually massive for this purpose.

The Douglas type of engine, carried for the purpose of driving the dynamo of the wireless and heating installation, is illustrated in photographs No. 78, 80, 81 and 82, which show various views of the motor and generator. The engine is a very close copy of the 2½ h.p. Douglas, and is made by Bosch. The fly wheel, as shown in photograph No. 80, is furnished with radial vanes which induce a draught through a sheet-iron casing, and direct it past cowls on to the cylinder heads and valve chests.

The generator is direct-driven through the medium of a pack of flat leaf sprockets, which act as dogs, and engage with the slots on the fly-wheel boss, as shown in Fig. 82.

What appears to be a transformer, used in conjunction with the wireless set, is illustrated in photograph No. 79.

The ponderous tail skid of this machine is illustrated in Fig. 66. It is built up of laminations of ash, and furnished with a heavy steel shoe and a large universal attachment.

Special Note.

A complete and detailed report on the above-mentioned gear box, giving the fullest possible information and analysis of metals, etc., will shortly be published.

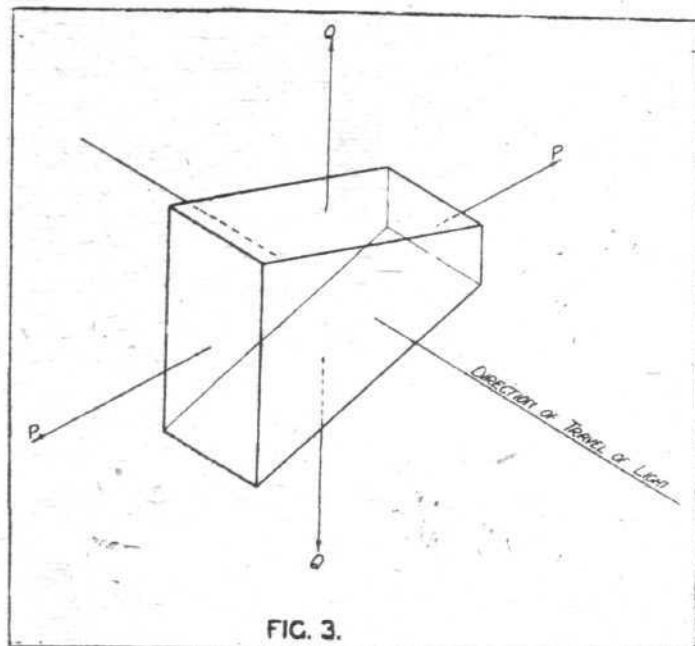
STRESS OPTICAL EXPERIMENTS

By MAJOR A. R. LOW, R.A.F.

(Continued from page 1356.)

(6) Simplifications in the Case of a Bar Under Flexure.

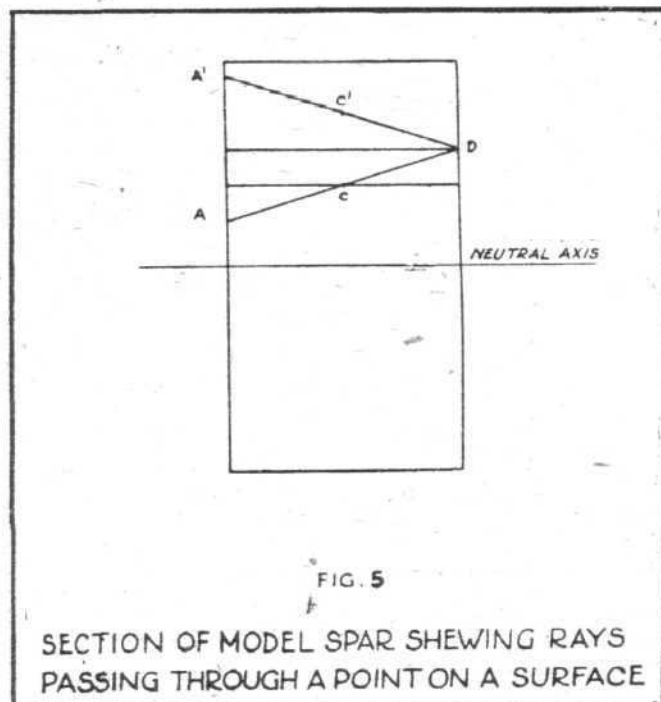
On the other hand, in many cases the principal axes of stress can be predicted, and thus much time and labour can be saved. For example, we know that in the case of a flat strip bent in its own plane by flexure without shear, the



principal axes of stress are parallel and perpendicular to the edge of the strip. In the experiments here described, the object was to explore the stresses in a horizontal bar under flexure, and although it was known that the flexure was not indeed without shear, yet such shear would in general be small compared with the axial tensions, or pressures, in the bar; at any rate, for points not too close to the neutral axes of the beam, so that it would be safe to assume that principal axes of stress were horizontal and vertical.

A further simplification can also be made; in a bar under flexure the transverse stress is always zero or very small, at any rate in those parts where the bar is free—accordingly in

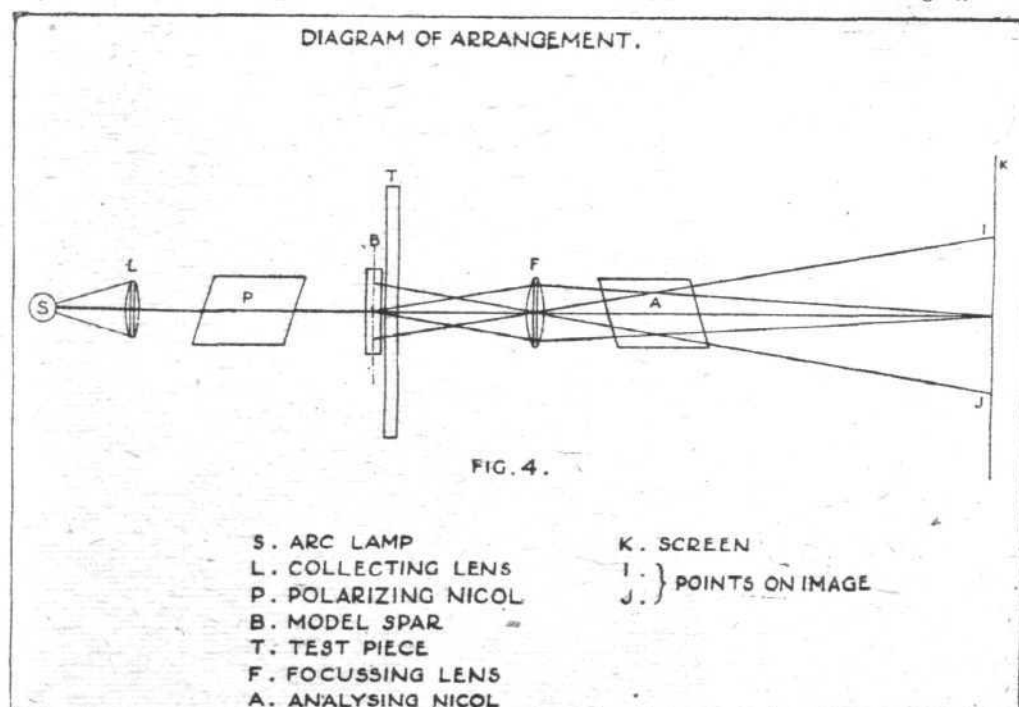
studied, but of variable breadth, so that its section tapered to a narrow neck (Fig. 3). The object of this was to give a continuous scale of tension or pressure (from 4 to 1 of the stress at the neck) enabling adjustments to be made without altering the total pull or thrust on the test



piece. This latter was applied by means of a screw fitted in a circular holding frame—the stress at the neck could thus be read off on a graduated thimble in accordance with a careful independent calibration.

(8) Optical Arrangements—Error of Obliquity.

The optical arrangements for the first set of experiments were as shown diagrammatically in Fig. 4. Light from an arc lamp, S, is gathered by a collecting lens, L, and after passing through a polarising Nicol, P, illuminating the bar B (shown in section in Fig. 4).



calculating the stress difference (horizontal-vertical) it was allowable to put the vertical stress = 0, so that the principal stress difference was taken as the horizontal stress in the bar.

(7) Test Piece.

The comparison test piece consisted of a piece of xylonite of the same material and thickness of the specimen to be

The vertical mid-section of the bar B is focussed by means of a lens, F, upon a screen, K, the light passing through an analysing Nicol, A (crossed with P), between F and K.

The object of focussing the median plane of the bar B, instead of its nearer or further face, is to eliminate a source of error due to the slight obliquity of the bulk of rays which traverse B. For we know that in a bent bar the stress varies in a cross-section as the distance from the neutral axis. Hence if a ray traverses the bar horizontally, the stress is the same throughout the passage, and the formula for the relative retardation, $r = aCP$ can be applied directly.

But in a ray such as ACD, Fig. 5, the stress in the part SD of the path is greater than the stress at C, and the stress in the part AC is less than the stress at C. The retardation = Cx total thickness traversed \times mean stress across path. But this mean stress is, in this case,

the stress at C. Hence, all rays through C have the same mean stress, and therefore the same retardation, for a slight obliquity makes no sensible difference in the total thickness traversed.

If then we focus on the median plane of the bar, all the rays which come to the same point of the screen have the same retardation, namely, that due to the stress at that point

of the median plane from which they come. We thus get the correct isochromatic lines for that median plane.

If, however, we were to focus on any other vertical plane, say one of the faces of the bar, then the various rays through a point D (Fig. 5) have different middle points CC, and therefore different retardations. The colours on the screen will therefore overlap and blur to a certain extent and accuracy will be impaired.

The position of the lens F was adjusted so as to give always the same magnification for the image, namely, the bar appeared on the screen as 12 ins. high. Points I, J (Fig. 4)

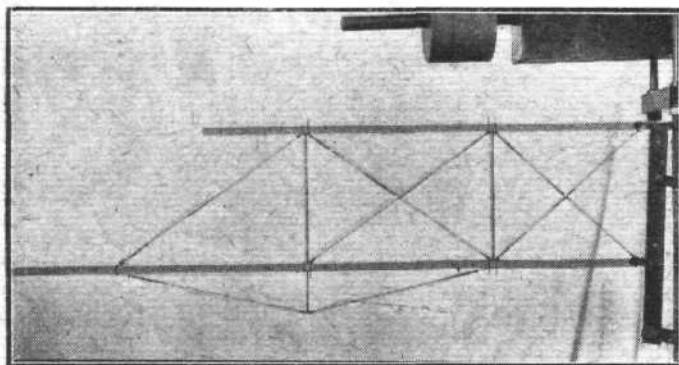


Fig. 6 shows the model with xylonite spars, steel struts and bracing wires, attached to a vertical post.

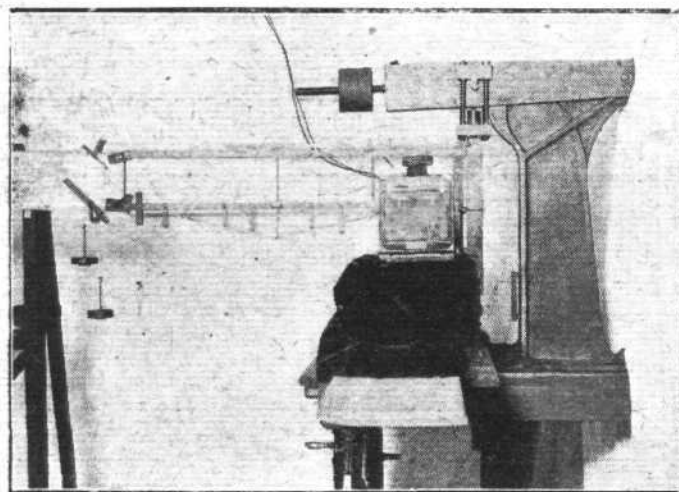


Fig. 7 shows the model with a guide frame and guide pieces to prevent lateral buckling and the back of the camera used in photographing the optical effects. The two weights are attached to horizontal wires which serve as base lines for measuring deflections.

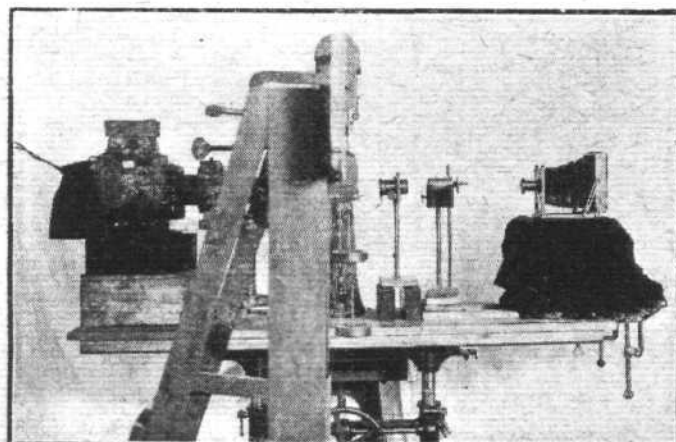


Fig. 8 shows side views of the installation, showing particularly the position of the optical apparatus. From left to right are placed the camera, the second Nicol, a collecting lens, the model, the first Nicol, concealed behind the trestle, and the arc lamp and lantern supplying a source of light and a collecting lens.

on the image, 2 ins. from the extreme edge on the tension and on the compression side, were selected as suitable points at which to determine the stresses.

These points had to be taken in preference to points close to the extreme edge because it was found that xylonite as it dries forms an outside "skin" which is under considerable

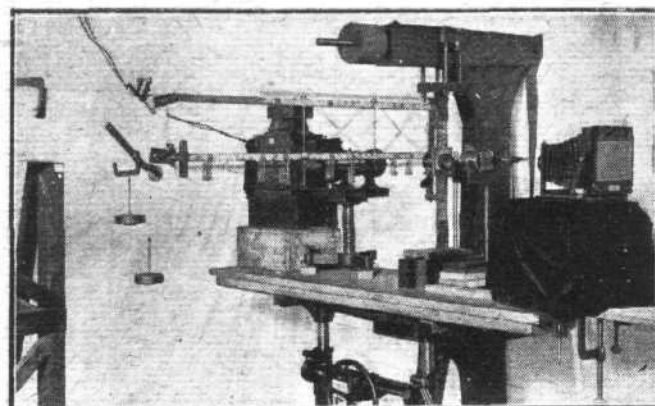


Fig. 9 gives a perspective view of the whole apparatus before the load is applied.

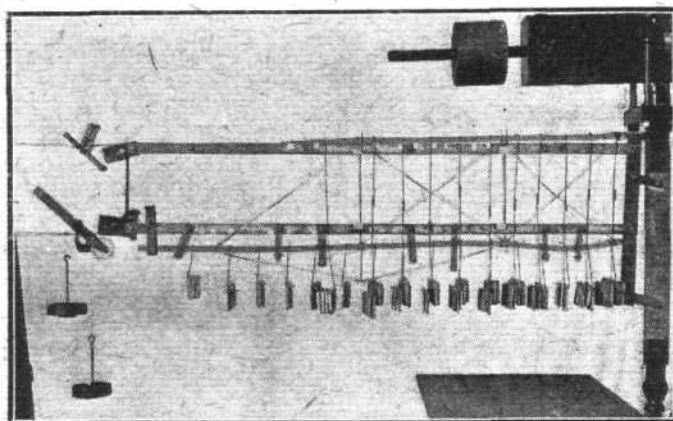


Fig. 10 shows the method of loading, the curvature of the spar, and the deflections of the nodes from the horizontal cross wires are easily visible to the eye.

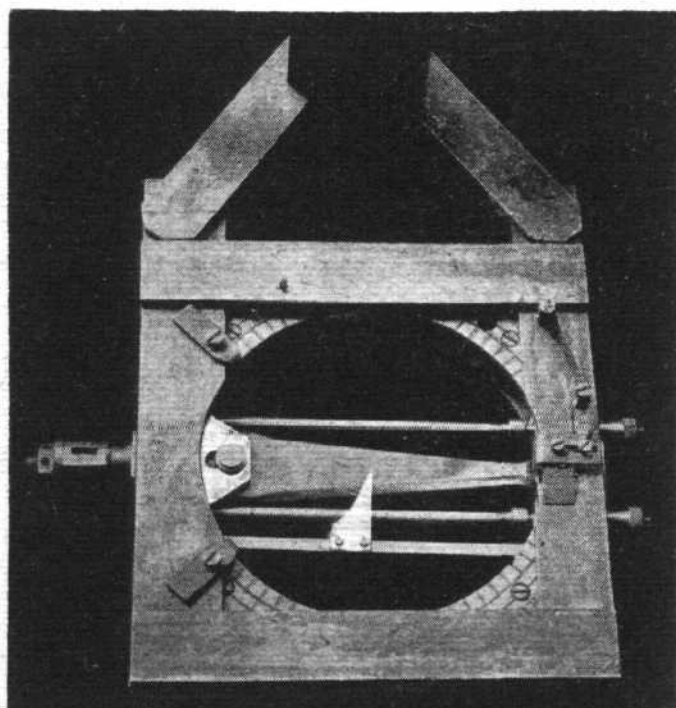


Fig. 11 shows the test piece actually used, as described in Section I, paragraph 7.

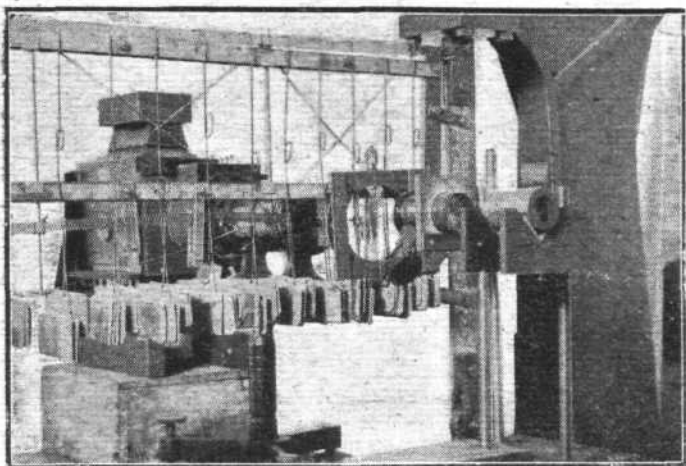


Fig. 12 shows the whole apparatus with the test piece in tension crossing the model spar and placed as close as possible to it, the beam of the polarised light being focussed on the median plane of the model spar. It is therefore not focussed on the median plane of the test piece, and a certain lack of clearness in the definition of the dark band neutralised by the test piece is accordingly produced. This effect is kept as small as possible by placing the test piece close up to the model spar. But a better arrangement suggested by Major Filon, and actually tried on another model, is obtained by interposing another lens between model spar and test piece at such a distance that the beam of light is again focussed on the median plane of the test piece as well as on the median plane of the model spar. In the present experiments the method of placing the test piece close to the model spar was used throughout, and it is considered that the blurring of the image inevitable in this method did not introduce any serious discrepancy.

initial stress, even when no load is applied to the bar, and on this account the colour bands are seriously upset by this initial stress in the neighbourhood of the edge, which is therefore best avoided when accuracy is required.

(9) Method of Observation Errors of Parallax.

The test piece was then placed with its length vertical and as close to the specimen as possible. The effect was to shift the neutral line from the centre line of the bar up or down through a varying amount, corresponding to the stress in the test piece. By adjusting the total pull or thrust in the test piece and also moving it slightly up and down, it was always possible to bring the black band with its centre on one of the points I, J. The stress in the test piece was then read.

Now let P be the stress in the specimen due to the loading, P_0 the permanent stress difference in the specimen at the point observed, and let T, T_0 be corresponding quantities in the test piece. In practice it was found that the permanent stress (which was small) had in general its axes roughly parallel and perpendicular to the length of the bar—and the same held good for the test piece.

We can therefore simply add P to P_0 and T to T_0 to get the total effect and we get

$$P + P_0 = T + T_0.$$

Another set of readings taken with the framework unloaded, so that $P = 0$. If T is then found to be T^1

$$P_0 = T^1 - T_0.$$

Subtracting $P = T - T^1$ gives a result for the stress due to

Practical Help for the R.A.E. Benevolent Fund

SOME very useful work has been done by the Benevolent Fund in connection with the Royal Aircraft Establishment. One of the most valuable supporters is Mr. H. Proctor, the artist, who gave permission for the fund to use a fine water-colour of an S.E.5A. The reproduction of the picture added about £110 to the funds. He has now given another picture, this time an F.E.2B, and it is hoped to raise a similar amount. This material help has considerably assisted the Committee, who are desirous of expressing their appreciation to Mr. Proctor accordingly.

Aircraft After the War.

At a concert held at the Queen's Hall on November 26th in aid of the Lord Roberts Memorial Workshops, Mr. J. A. Whitehead gave a short address in which he emphasised the great progress which had been made in flying during the War, and pointed out how necessary it was that Great Britain should turn this supremacy in the air to account in connection with commercial aviation. He stated that Whitehead Park at Feltham was being organised as a great aerodrome from

the loading, which should be fairly independent of the permanent stresses in beam and test piece. To get the best possible results the test piece should have been changed from tension to compression when passing from I to J (or conversely), as it is found that a number of causes of error) and in particular the possibility that the stress optical coefficient C may be slightly different for large pressures and large tensions) are eliminated if we take care always to have the bar and specimen at right angles, so that at the points examined the two are always under stresses of the same name.

It was not, however, found convenient to do this. With the high loads employed a considerable amount of "creep" showed itself in the material. This "creep" itself modified the applied stress system, by increasing the part of the bending moment due to thrust and in this way the stress in the material showed progressive increase with time. It was therefore important to make all measurements at I and J as nearly simultaneous as possible, and the time taken in re-adjusting the test piece from tension to compression was prohibitive. The method employed then was to use the test piece in tension, only placing it at right angles to the specimen where tensions were to be measured, but parallel to it to measure pressures.

A little difficulty was experienced owing to the fact that the test piece and bar could not be in focus together, so that the graduations of the test piece were always somewhat blurred. This difficulty, however, was not such as to seriously affect the observations.

A certain amount of overlapping of colours must also necessarily occur owing to rays from the same point of the median plane of the specimen passing through different parts of the test piece. This "parallax" error undoubtedly must have slightly impaired the definition, and it may in addition have introduced a small systematic error.

In later observations all these troubles due to parallax were removed by separating the specimen and test piece, and introducing between them a lens, so that the median planes of the specimen and test piece were focussed upon each other and the two were finally focussed together upon the screen.

(10) General Accuracy of Optical Observations of Stress.

Some idea of the accuracy with which such observations of stress could be taken with xylonite was obtained by using a specimen strained under flexure without strain, the bending moment on which was exactly known. In this case the stress in the specimen can be calculated exactly. By measuring it independently with the test piece, we can form an estimate of the errors made by this process.

The measurements were taken with test piece and specimen crossed and parallel, and also with the specimen in tension and with the specimen in compression.

By taking means of the four measurements the permanent stresses were eliminated, the same point of the specimen and of the test piece having been used in all four.

Altogether the results showed a mean probable error according to the following table:—

Range of stress.	No. of observations.	Mean probable proportional error.
100-500 lbs.	95	·057 (2)
500-1000	108	·032 (3)
1000-1500	60	·031 (4)
1500-2200	24	·045 (1)
100-2200	287	28·5 lbs.

(To be continued.)

which aerial services might start, not only for the Continent, but also for various parts of England. In this connection he outlined some of the advantages which would accrue to business people from the speed with which journeys from point to point could be accomplished.

Lord Cheylesmore, who occupied the chair, made a stirring appeal on behalf of the Lord Roberts Memorial Workshops, and invited anyone interested in the work to visit the workshops and see the men at their various tasks.

Useful Work by the I.A.F.

In a letter describing the work of looking after the prisoners who are coming back from Germany on foot, Sir Arthur Lawley, British Red Cross Commissioner in France and Belgium, mentions that at Nancy where the men came in in hundreds, he got into telephonic communication with the Independent Air Force, and before he left they had the situation well in hand in caring for the men and seeing that they were supplied with clothing, food, etc., the American Red Cross, who have a stores depôt in Nancy, lending their aid.

THE ROLL OF HONOUR

(When an Officer is seconded from the Army, his unit is shown in brackets.)

Published November 27th

Attwater, Sec. Lieut. K. F.
Carter, Sec. Lieut. J.
Dodd, Lieut. A.
Hooper, Sec. Lieut. E. A.
Hutcheson, Lieut. C. E.
Jackson, Sec. Lieut. W. V.
Leaf, Lieut. W. H.
Leonard, Sec. Lieut. T. L. W.
Malley-Martin, Lieut. J.

Killed

Morgan, Capt. J. T.
Mulley, Sec. Lieut. E. H.
O'Connor, Sec. Lieut. R. V.
Pink, Lieut. A. L.
Samuelson, Sec. Lieut. F. A.
Smee, Lieut. J. A.
Taviner, Sec. Lieut. E.
Thwaite, P.F.O. M. F.
Topley, Sec. Lieut. E. P. A.

Died of Wounds

Marks, Lieut. L. T.

Died

O'Connell, Lieut. P. M.

Barnes, Capt. G.
Cote, Lieut. J. A. R.

Previously Missing, now reported Wounded and Prisoner

Beck, Lieut. T., M.C.

Previously Missing, now reported Prisoners

Dunn, Lieut. M. A.
Hall, Lieut. R.
Houlgrave, Sec. Lieut. C.

Repatriated

Lockey, Lieut. B.
Mars, Lieut. W. S.
McDonald, Lieut. J. J.
McManus, Sec. Lieut. G. E.
Munro, Lieut. J. G.
Oakley, Sec. Lieut. K. S.
Olorenshaw, Sec. Lieut. J.
Pendleton, Sec. Lieut. W.
Peters, Sec. Lieut. J. F. J.
Potter, Lieut. S. B.
Power, Sec. Lieut. H. E.
Read, Lieut. J. F.
Smith, Lieut. F. L.
Thomas, Sec. Lieut. C.
Vance, Lieut. J. D.
Wilson, Sec. Lieut. M. G.
Wynne-Eyton, Capt. R. M.

Published November 28th

Killed

Chaffey, Sec. Lieut. H. E.
Charlton, Lieut. B.
Cotter, Sec. Lieut. B. C.
Deltiel, Sec. Lieut. L. R.
Hocking, Lieut. E. C.
Holmes, Sec. Lieut. E. L. R.

Died of Wounds

Adams, Sec. Lieut. P. C. W.
Adderley, Sec. Lieut. W. H.
Davis, Sec. Lieut. E. E.

Died

Cawston, Sec. Lieut. G.
Duggan, Lieut. G. W., M.C. (Can. Cav.).

Finbow, Sec. Lieut. W. G.
Wildish, Sec. Lieut. J. E.

Cadets Killed

Baker, D. W.
Carter, H. L. J.
Casserly, C. T.

Dick, A. L.
James, W. L.
Lazenby, L. A. L.

Préece, B. G.
Seddon, A.

Wounded

Brown, Capt. C. A.
Brown, Sec. Lieut. J. M.

Humphreys, Sec. Lieut. J. C.

Previously Missing, now reported Wounded

Sleigh, Sec. Lieut. T. W.

Missing

Amm, Lieut. E. O.
Coulthurst, Sec. Lieut. W. G.
Ibison, Sec. Lieut. K. G.

Gompertz, Sec. Lieut. H. C. T.
Upton, Sec. Lieut. W. G.

Published November 29th

Killed

Arbuthnot, Capt. L. S.
Bowler, Sec. Lieut. W. J.
Callender, Capt. A. A.
de Bathe, Lieut. H. M.
Evans, Lieut. A. F.
Hodgskin, Lieut. A. F.
Knox, Sec. Lieut. W.

Pike, Sec. Lieut. F. W.
Reid, Sec. Lieut. A. T.
Scholes, Sec. Lieut. A. V., M.M.
Sharrock, Sec. Lieut. W.
Sutherland, Capt. H.
Williams, Sec. Lieut. S. H.
Woodcock, Capt. F., M.C.

Died of Wounds

Rochfort, Lieut. A. D'O.

Died

Barnet, Lieut. D. G.
Bauer, Capt. D. C., D.F.C.
Cameron, Lieut. C. C. (Aus. F.C.).
Carrigan, Lieut. L. P. S.
Child, Lieut. J. E.
Cole, Capt. C. C.
Evans, Lieut. S. D.
Goodchild, Lieut. V. G.

Johnson, Sec. Lieut. R. W.
Kidd, Sec. Lieut. J. A.
Pagdin, Lieut. G.
Pickering, Lieut. G. (Aus. F.C.).
Rutledge, Sec. Lieut. W. T.
Sherwood, Lieut. F. C.
Spicer, Lieut. E. A.

Alban, Lieut. A. H.
Burslem, Lieut. F. G.
Richards, Lieut. J. W.
Ricketts, Sec. Lieut. H.

Cleghorn, Capt. W. F., D.F.C.

Armstrong, Capt. D. V.
Burt, Sec. Lieut. J.
Heslop, Sec. Lieut. A. V.
Hinton, Sec. Lieut. F. A.
Lane, Sec. Lieut. R. W.
Leckenby, Sec. Lieut. J. G.

Previously Missing, now reported Killed

Banfield, Sec. Lieut. C. B. (R.F.C.).

Bramham, Capt. E. S.
Brennan, Sec. Lieut. D. P.
Cape, Lieut. A. D.
Cilliers, Lieut. G. P.
Dowse, Lieut. H. H.
Gilfillan, Lieut. A. W.
Harman, Lieut. L. W.

Cooper, Capt. M. L.

Previously Missing, now reported Wounded and Prisoners

Carter, Sec. Lieut. G. L.
Crawford, Capt. C.

Previously Missing, now reported Prisoners

Bond, Lieut. F. E.
Leighton, Lieut. K. A. W.
Perring, Sec. Lieut. J. H.

Pineau, Lieut. C. F.

Published December 2nd

Killed

Abell, Capt. C. E.
Baldie, Lieut. J. B.
Faulkard, Sec. Lieut. W. L.
Holmes, Lieut. J. C.
Jones, Sec. Lieut. E. B.

Lenihen, Sec. Lieut. J. H.
Mees, Lieut. I. R.
Melling, Sec. Lieut. H.
Royle, Sec. Lieut. R. L. C.
Smith, Sec. Lieut. F. L. P.

Drowned

McConnell-Kerr, Capt. D.

Died of Wounds

Clark, Sec. Lieut. J. H.
Howard, Maj. G. R., D.S.O.
Nichols, Sec. Lieut. J. J.
Smith, Sec. Lieut. D. McQ.

Strange, Sec. Lieut. H. S.
Thorn, Sec. Lieut. H. J.
Wills, Lieut. O. B. W.
Woodland, Sec. Lieut. G. H.

Previously reported Died of Wounds, now reported Died

Swann, Lieut. L. K. (Aus. F.C.).

Accidentally Killed

Logan, Lieut. T. E. (Nova Scot.).

Mundy, Lieut. C. R. (Manit.).

Cadets Killed

French, E. V.
Kennedy, W. G.

Kettlewood, A. J.
Matthews, H. C.

Merrill, V. N.
Millard, S. H.

Published December 3rd

Killed

Bowler, Sec. Lieut. H. C.
Fleischer, Sec. Lieut. D. C.
Kinghorn, Sec. Lieut. W.

Ruffridge, Sec. Lieut. G. A.
Thomson, Lieut. R. R.
Williams, Sec. Lieut. A. H.

Previously reported Wounded, now reported Died of Wounds

Till, Sec. Lieut. E.

Died

Aston, Lieut. H. N.
Harrison, Lieut. H. L.
Hook, Lieut. G.
Jones, Capt. Rev. G. W.

Lowe, Sec. Lieut. H. A.
Pawson, Lieut. G. St. V., M.C.
Pritchard, Sec. Lieut. R. O.
Wilson, Lieut. V. B.

Wounded

Farncombe, Sec. Lieut. H.
James, Capt. H. H.
Jenner, Lieut. W. J. P.

Langford, Sec. Lieut. E. W.
Sanderson, Lieut. I. C.

Previously Missing, now reported Wounded

Crichton, Sec. Lieut. A. C.

Drummond, Sec. Lieut. G. L. P.

Missing

Gadd, Sec. Lieut. W. G.
Glew, Sec. Lieut. W.

Payton, Lieut. C. W.

Previously Missing, now reported Prisoners

Arthur, Lieut. T. J.
Foggo, Lieut. N. O. M.
Gilmour, Capt. S. G.
Henderson, Sec. Lieut. A. B.
Hopper, Sec. Lieut. R. W.

Hutchinson, Sec. Lieut. W. J.
Ivens, Sec. Lieut. J. C.
Rochester, Sec. Lieut. G. E.
Smith, Lieut. G. H. B.
Windover, Capt. W. E.

Previously Missing, now reported Wounded and Prisoner

Macpherson, Sec. Lieut. J. M.

Marshal Foch's Aerial Escort

ALTHOUGH the weather was bad for flying, the R.A.F. carried out their arrangements in providing an aerial escort for M. Clemenceau and Marshal Foch during their journey to London. The destroyer on which they crossed the Channel was convoyed by 27 British aeroplanes of various types, and on arrival at Dover a second formation "took over" and escorted the special train to the Metropolis.

Postponement of Mr. C. Grahame-White's Lecture

OWING to the proximity of the General Election on December 14th, the lecture by Mr. Claude Grahame-White under the auspices of the Royal Aeronautical Society on Civil Aerial Transport, at which Lord Northcliffe was to preside, has been postponed. The lecture will be given at an early date after Christmas, which will be indicated in due course.

THE TREND OF GERMAN AEROPLANE DESIGN

[Issued by Technical Department (Aircraft Production), Ministry of Munitions.]

Performances

ENEMY aeroplanes which have been captured intact or reconstructed have, under test, generally shown themselves poor in performance, judged by British standards, especially in point of speed at heights; but it would seem that as a rule they are fairly good in point of climb, and notably good in regard to manoeuvrability. Pilots report them, in the main, comfortable to fly and easy to land, especially the more modern types.

Wing Section

Scale drawings showing the wing sections employed are included in the detailed reports on the various enemy aeroplanes. In general they do not differ very markedly from British wing sections, though there is a distinct tendency towards rather greater camber. It is thought probable that this principle has been adopted so as to yield better results at high altitudes when the angle of incidence would necessarily be somewhat big.

Practically all German aeroplanes have a pronounced wash-out at the tip of the trailing edge. In the most recent example of Halberstadt design, namely, the C4 type, the lower wings are given a heavy wash-out at their junction with the bottom of the fuselage, the idea being to minimise the surface of discontinuity which would otherwise exist between the bottom surface of the fuselage and the wing roots. Thus the front spar is straight, but the rear edge is markedly concave. This effect exists to such an extent that the trailing spar is considerably bent as well as twisted.

The Fokker wing section is in a class by itself, not only on account of its great depth, but also in having only a very slight camber on the bottom surface. The performance of this machine is, however, by no means despicable, and it is generally conceded to be a redoubtable opponent in spite of the departure from optimum wing section which has been made.

Bays

As far as single and two-seater machines are concerned, the usual wing construction involves a single pair of struts at each side, but it is noticeable that in the latest model Pfalz scout, the Dr2, this practice has given place to double pairs of struts. Indications point to great strength having been made a matter of prime importance in this design.

In some types, notably the Pfalz and the Fokker, the upper plane is made as a single unit. In the latter case, the lower plane is also in one piece. In the generality of machines, however, the centre section principle appears to be gaining vogue. Thus, whereas the L.V.G. C5 has a *cabane* consisting of the usual pyramid of struts, its successor, the C6, is furnished with a centre section embracing a gravity petrol tank and the radiator, both of which are let into the plane flush with its top and bottom surfaces. The Halberstadt and Hannoverian designs employ the same scheme.

Spars

Shortage of ash and spruce has led to the general adoption of built-up spars, which are of such a variety of types that a separate report is being issued upon their design. In nearly all cases ply-wood plays an important part. Thus in the Fokker biplane the spar, which, owing to the absence of the usual wire bracing of the wings, is extremely deep, consists of two thin rails of spruce united by deep ply-wood webs. In the Gotha bomber a built-up I section spruce spar is covered in with ply-wood at each side. On the Giant Four and Five-Engined bombers the spars are of hollow rectangular section, strengthened by a transverse web across the middle of the box. The latter is built of numerous components tongued and grooved together. The whole is strengthened by walls of multi-ply glued on each side. In the Halberstadt design the built-up spruce spars are reinforced by broad horizontal webs of ply-wood running longitudinally, and at each edge of these are stringers. The whole spar construction thus represents a section similar to an H lying on its side, of which the central box spar forms the cross bar.

The A.E.G. machines are alone in employing steel tubular spars.

Other German designs, such as the Pfalz, D.F.W., L.V.G., Rumpler, and Albatros employ built-up spars of the ordinary accepted type, either of box or I section.

Wiring

With the exception of the Fokker biplane and triplane, which have no external wire bracing whatever in the wings, the rigging of German machines is upon the accepted lines. The standard material is multi-strand cable furnished with whipped and sweated splices at the loops. Quick detachment

devices, which at one time were fitted on several German models, have now disappeared. For internal wiring, both plan wire and stranded cable are used. In the Fokker design, the angle of the drag bracing cables between the struts seems to be very bad, but according to reports this machine is actually unusually strong. Drag bracings are in some cases taken from the front of the fuselage, but in most designs are confined to the interior of the wings. In no case is the under-carriage used to form a component of the bracing system.

In most machines the compression struts between the spars, for drag bracing, are steel tubes, but in some cases, notably the Fokker, Halberstadt, and Albatros, wooden box ribs are used for this purpose.

Fuselages

The standard type of German fuselage construction embodies a three-ply shell built up on light wooden formers. It is generally of the wireless form, but in some cases the forward portion in the neighbourhood of the wings and engine is strengthened with diagonal bracing. This is adopted also in the Gotha in that part of the body which embraces the cockpits and petrol tanks.

Exceptions from this general rule are the A.E.G. two-seater, the A.E.G. bomber, and the Fokker (biplane and triplane). In all of these steel is exclusively used for the fuselage construction, the transverse members being welded to the longerons. In the four and five-engined Giant bombers the rear portion of the fuselage, including the longerons, is of steel tube, whilst in the Friedrichshafen bomber wooden longerons are used in conjunction with steel tube compression members.

In nearly all cases the wooden fuselage is roughly rectangular in section, with corners rounded off, and tapers to a vertical knife-edge at the rear. In the Halberstadt, on the contrary, it tapers, in a manner similar to that of the Bristol fighter, to a horizontal edge. In the Pfalz designs great pains have been taken to produce a fish-shaped body of perfect streamline form; this is of approximately elliptical section throughout, though leaning towards a sharp "backbone" near the tail. The performance of this design is, however, relatively poor, and the rather elaborate streamlining appears to bring no great material benefits.

In the Albatros and the earlier Pfalz the fin is built in one with the fuselage, and very neatly faired off; but it is notable that in the latest Pfalz this practice has been discarded in favour of a detachable fin.

Tail Surfaces

The use of fixed fins and tail planes is now standard on all German aeroplanes, and in nearly all cases both the rudder and elevator are balanced. In some cases—notably the Fokker biplane—the fin is offset so as to mitigate the turning effect due to the swirl of the slipstream. In the Hannoverian fighter a biplane tail is incorporated with a view to reducing the blind area of the movable machine gun.

In all the big bombers—the Gotha, the Friedrichshafen, and the Giant machines of both types—a biplane tail is now a standard fitting, though it has not yet been adopted on the A.E.G.

In practically all cases the framework of the tail organs is of light steel tube, and in general this applies to the fixed planes as well as to the controllable surfaces. In the Pfalz, Albatros, and L.V.G. designs the fixed plane frames are of wood, and covered with thin ply-wood.

In some cases—notably the A.E.B. bomber—the fixed planes are of heavily cambered streamline section. The same practice, though to a less noticeable extent, is embodied in the latest Halberstadt; but in the Fokker, which is to be regarded as one of the most up-to-date German types, flat uncambered surfaces are exclusively employed. In this case, too, the fixed tail plane is made in one unit and dropped into brackets on the top side of the fuselage, instead of being constructed in two halves, and placed one on either side. This principle has also been adopted in the most recent Halberstadt.

Controls.

The control gear on German aeroplanes calls for very little comment, being, in all but the large bombers, of the standard univesally jointed stick pattern. The arrangement of the rocking shaft varies, being, in some cases, fore and aft, and in others transverse. The rudder bars are almost invariably made of welded sheet steel, and are generally fitted with toe-straps. In recent machines the pilot's seat is frequently adjustable, whereas in earlier designs it was more common to find the leg reach adjustable on the rudder bar. In several

cases a locking device is employed, so that the elevator can be fixed at any angle. In the Fokker biplane the control gear is extremely light compared with that of other enemy designs.

Wheel control for the *ailerons* is only used on the large bombers, such as A.E.G., Gotha, and Friedrichshafen. In the first-named, a dual control for the elevator and rudder is provided, but in the others no form of dual control at all is found. In the giant aeroplanes double control, operated by two pilots simultaneously, is adopted, as the physical effort called for is beyond the capacity of a single man.

Struts

Probably owing to a shortage of timber, wooden interplane struts are very little used, and are only found in the Friedrichshafen, L.V.G., and the older type of Pfalz. Steel struts are either tubes of round section faired off with a three-ply or solid wood streamlining, or of oval section, the latter practice being increasingly popular. In some cases the strut ends are tapered and welded to a socket; in others the tube is kept full section, and is dropped over an eyebolt at each end. N struts for the junction of the top plane and the fuselage are common, and are also used between the planes in the Pfalz and Fokker models. Oval steel tubes for undercarriage struts are practically universal, the L.V.G. being the only design incorporating wooden members in this position.

Fabric and Dope

In general, there are two types of fabric found on enemy aeroplanes. They are of similar material, but differ in colouring. That intended for scouts and fighters is camouflaged in the familiar pattern of irregular polygons of light colours, whilst that for bombers is of such dark tones that the shapes of the polygons can scarcely be discerned. In some examples of the Fokker biplane the upper surface of the wings is painted a bright colour, such as red, over the top of the dyed camouflage scheme. The Pfalz was formerly covered with an aluminium dope, but this has now given way to the standard colouring.

The quality of fabric is, in general, good, but in most cases the dope seems to be carelessly applied, and not thoroughly "worked in" to the material, from which it readily peels off.

The bodies of aeroplanes are sometimes left natural wood colour, as in the L.V.G.; sometimes, as in the Fokker, painted in two bands of bright colours; but more often covered with a cloudy camouflage effect, consisting of soft, low-toned colours, gradually fading into one another and apparently sprayed on.

Pilot's View

It would appear that in recent designs the necessity of giving the pilot a good view has received more consideration than in the past. The Fokker, Hannoveraner, and Halberstadt machines are excellent in this respect. The bombers seem also to be good, with the exception of the A.E.G., which is very awkward indeed.

Undercarriage

For scouts and two-seaters the plain axle slung to V struts is invariably adopted. In most cases neither the axle nor the tie rod are faired off, but in the Fokker types, both monoplane and triplane, the axle fairing has been developed into a lifting surface. In the larger bombing machines current practice varies considerably. Thus in the Friedrichshafen there are three two-wheeled axles—one under each engine and the third under the nose of the fuselage. This system has been adopted in some of the giant aeroplanes. In the Gotha there are two two-wheeled axles under each engine, whilst in the four-engined giant under each engine unit is a ponderous single axle supporting at each end four wheels placed side by side.

Shock Absorbers

Rubber bands have now entirely disappeared, and their place has been taken by steel coil springs. In some cases three coils, of alternate "hand," are placed one inside the other; in others, three small coils are grouped together in a "clover leaf" and covered in with cotton fabric. The weight of spring used on the average machine is about 5 lbs. for each wheel. In the Gotha the shock-absorber springs are concealed in the undercarriage struts, and are worked by a cable passing over pulleys. Steel-shod wooden tail skids are almost always used, but are not made steerable.

Engine Bearers

In most scouts and two-seaters wooden bearers, sometimes of ash, but more often of pine, are supported on multiply-wood bulkheads, but in the Fokker and A.E.G. designs the construction is of steel tubes, to which flat clips are fixed for the support of the crankcase arms. In the A.E.G. bomber the bearers are hollow steel of rectangular section. Owing

to shortage of suitable timber, the bearers on the giant aeroplanes, which are necessarily very long, are built up of a soft wood centre piece, reinforced top and bottom with five half-inch layers of ash.

Engine Controls

On a few machines—notably the Hannoveraner—this is fitted in duplicate, there being, in addition to the usual throttle lever, another controlled by Bowden wire from the control stick. In the multiple-engined bombers separate engine throttle levers for each engine are installed, and in the two-engine type they are so placed as to be operated together when required. The same applies to ignition advance levers, but where Mercedes engines are used the ignition control is coupled up to the throttle.

Radiators

Several types of radiators are in use on German aeroplanes, and in nearly all cases they are fitted with some simple form of shutter, which is used in conjunction with an electrical rheostat thermometer. Formerly it was the general practice, especially in two-seaters of the D.F.W., Rumpler, A.E.G., and L.V.G. patterns to mount a rectangular radiator in front of the *cabane*, just underneath the top plane; but in the latest L.V.Gs. this method has been discarded, and a curved radiator sunk flush in the centre section is adopted in its place. Generally speaking, this plane radiator is now standard in two-seater designs, but in the Pfalz, which previously incorporated this scheme, the latest pattern has a nose radiator of vertical tubes, the arrangement being somewhat similar to that of the Fokker biplane; these two machines are in this respect in a class by themselves.

On bombers the usual design embraces a car type radiator at the front end of the engine bearers, but in the four and five-engine giant machines the use of gear boxes has prevented this practice being adhered to, and in these the radiators are carried well up above the motors, and fixed either on the engine bearer struts or on wires.

In the flush pattern of radiator the tubes are horizontal and of flattened oval section, and are set with their major axis inclined. The tubes are in two cells, which are separated by baffle plates, which ensure that the water runs from side to side, then down, and then from side to side back again. A short-circuit tube is nearly always provided to guard against the formation of air locks in the upper portion of the water tank. Another fitting frequently met with is a small subsidiary water tank mounted above the radiator and connected to the main filler cap with a tube. The top of this tank is fitted with a trumpet-shaped nozzle pointing forward.

Gears

It is significant that in the four and five-engined giant aeroplanes massive gear boxes are used in conjunction with standard engines of the Mercedes and Maybach type. As might be expected with six-cylinder motors, the gear boxes are very heavy. In the four-engine machines they had shallow casings fitted with cast aluminium cooling fins, and were connected to the engines by flexible couplings and external shafts. In the five-engine design the shafts are enclosed within the gear box. Plain spur pinions are fitted and the ratio employed both for tractor and pusher screws is 21/41. The gear boxes are of two distinct types—a short one for the tractor screw and a long one for the pusher. The latter is given considerable overhang in order to obviate the need for cutting away a section of the trailing edge to give clearance for the screw. This idea had been adopted both on the Friedrichshafen and Gotha designs, doubtless with some noticeable loss in efficiency.

Each gear box, including the flywheel on the engine which it necessitates, the flexible coupling, and the oil radiator, adds a weight of 346 lbs.—a little over 1.15 lb. per horse power. It is obvious, however, that the gain in propulsive efficiency is considerable.

The oil radiator referred to consists of a semi-circular tank slung under the gear box, and containing 65 tubes of, roughly, 20 mm. diameter. Oil is circulated through this and the sump in the gear box by a pinion pump driven through worm gears and a flexible shaft from the driving pinion shaft of the gear box.

Petrol Systems

These generally incorporate two tanks—one gravity and one under pressure supplied by an engine pump—except where Benz engines are installed. In this case a petrol pump is employed, which supplies a tubular chamber, from which the overflow returns to the main tank: a hand petrol pump of the semi-rotary type is used for filling the gravity starting tank. The last-named is frequently let flush into the centre section of the upper plane, or is strapped on to it, except in the D.F.W. and Pfalz designs. In the former it is placed

on the top of the main tank, and forms the back of the pilot's seat; in the latter it is under the engine cowling. In the Fokker, the main, auxiliary, and oil tanks are incorporated in one unit, and a hand pressure pump is fitted for starting purposes. A small windmill, similar to that on the D.H.9 aeroplane, was found in the wreckage of the five-engined giant, and it is conjectured that the enemy may have turned his attention to this kind of petrol supply mechanism.

Propellers

Owing to the shortage of the best classes of timber, mahogany and walnut are now frequently replaced by ash, pine sycamore, and maple. The screws of the giant bombers, being geared down, roughly, 2 to 1, are not very heavily stressed, and are made entirely of soft wood covered with thin veneer, the grain of which runs across the blade.

Wireless

The majority of German aeroplanes are internally wired for greater wireless capacity, but are only fitted with transmitting apparatus when this is actually going to be used. In some cases the dynamo is driven from a pulley on the engine in conjunction with a hand-controlled clutch, but in modern types it is commoner to find the dynamo supported on one of the undercarriage struts, and driven by a screw in the slip-stream of the tractor. On the five-engined giant a Douglas type horizontally opposed engine of about 3 h.p. drives the wireless and heating generator.

THE R.A.F. AIRSHIPS

Now that hostilities have ceased it is possible to tell in brief the story of Royal Air Force activities during the War in the development of airships. As these craft have worked almost entirely with the Navy, their work has necessarily been kept as secret as the other operations of the Silent Service. The outbreak of war found the Royal Navy in possession of seven airships, all of the non-rigid type. On October 31st, 1918, the number was 103, including rigids and non-rigids. During the war the functions of airships have been two, namely, to combat the submarine menace and to act as scouts for the Fleet. Bomb-dropping raids over land were not attempted by British airships, and were only considered of minor importance by the Germans.

Rigid airships are the best of scouts for a fleet. The Germans owed their escape after the Battle of Jutland to their Zeppelins. It was Zeppelins which made possible the escape of the flotilla which raided Scarborough on Easter Monday, 1916, and it was Zeppelins which enabled "U"-boats to torpedo His Majesty's ships "Nottingham" and "Falmouth." The struggle with the submarine menace entailed two sorts of work, patrol and convoy. While on patrol the airships were able to compass the destruction of numerous submarines, either by using their own bombs or by summoning surface craft. They were also able to direct vessels out of a danger zone. Mines were likewise observed and destroyed.

The system of convoy by airship proved extremely successful. No ship was ever sunk while under escort from the air. This work was very arduous and required constant vigilance. Airships are not so independent of weather as

Armament

On scouts it is now usual to find two fixed guns firing through the screw and furnished with the usual interrupter gear operated by Bowden wire from the pilot's control stick. On some two-seater machines provision has been made for two fixed guns, but generally only one is fitted. The mountings for the movable observer's gun vary considerably, but in most machines they comprise wooden rings of rather clumsy design. In the Halberstadt it is notable that the gun mounting is erected well above the top of the fuselage, and is streamlined in section as much as possible.

The chief machine designed for offensives against troops in trenches is the armoured A.E.G. two-seater. In this case the pilot has no gun at all, but the observer has three—one movable on a rotating turret, and two fixed weapons firing forward and downward, at an angle of 45° through the floor. It appears that the only other armoured aeroplanes are the Junker and the Albatros, but examples of this type have not been captured.

Bombs

Small bombs are invariably carried in vertical magazine racks inside the fuselage, and discharged through a trap-door in the floor. The larger bombs are fitted in cradles under the fuselage, and also underneath the wing roots. On the later Gothas an electrical signal device is used to indicate that the bomb has actually left the machine. On these machines the medium-sized bombs appear to be generally released in pairs.

are heavier-than-air craft, but it is interesting to note that in 1918 up to the signing of the armistice there were only nine days on which no flying took place. It is a popular belief that airships require an extravagant number of mechanics. When the number of flying hours is set against the number of hands employed airships are shown to be more economical in man-power than heavier-than-air craft, as the following figures show:—

	Aeroplanes and Airships.	Seaplanes.
Men employed per hour flown	1.62	3.52
Hours flown per man employed	1.04	0.40
Average duration of patrol	6h. 17min.	2h. 2min.

The following table shows the hours flown from 1915 to October 31st, 1918:—

	Hours.
1915..	339
1916..	7,078
1917..	22,389
1918..	53,554

The total casualties to airship personnel during the war were 239, of which 48 were fatalities due to flying accidents and enemy action. For every fatality suffered 42,548 miles were flown. In the airship service credit is claimed, not for losses suffered but for losses inflicted on the enemy, and for averting losses from one's own side. When the potential destructiveness of each "U"-boat is considered the services of the airships in securing the food supply of Great Britain and escorting troopships cannot easily be overrated.

An American Seaplane Record

A MESSAGE from Washington reports that a new three-engined seaplane for the U.S. Navy set up a new record by flying with 50 passengers from the naval air station at Rockaway to New York on November 27th. The machine is equipped with three 400 h.p. Liberty engines, and the cruising speed is said to be 80 miles per hour.

A Norwegian Record

ON November 19th Lieut. Dietrichsen set up a speed record for Norway by flying 620 miles in 8½ hours.

Aerial Mails in the U.S.A.

It appears that the success which has attended the aeroplane mail services which have so far been arranged in the States, has been sufficiently encouraging to induce the authorities to release several hundred aeroplanes for this purpose, and plans are now under consideration for the organisation of such services between many of the leading cities in the States.

"Electrical Welding"

OWING to the General Election, the Institution of Mechanical Engineers has decided to cancel the meeting originally arranged for December 13th. The next meeting will be on January 24th, when Mr. T. T. Heaton will read a paper on "Electrical Welding."

An International Aerodrome at Leeds?

AMONG the municipalities who are fully alive to the possibilities of international aerial travel must be counted Leeds, which has a very enterprising Chamber of Commerce. At a recent meeting of this body it was pointed out that the city is favourably placed for becoming the principal halt between London and Edinburgh, and might easily become eventually the English terminus of a Continental service, although it was realised that Hull might be chosen for the immediate future from the latter point of view.

It was suggested that for inland purposes a 200-mile flight would possibly be a recognised standard, while in continental journeys, flights would probably be made in 500-mile stages.

Aeroplane Flight to Australia

THE Aerial League of the British Empire announces that it is organising a flight to Australia via India. It is stated that certain offers of financial assistance have been received conditional upon the full amount being subscribed, and it is hoped this will be forthcoming before the preliminary work is completed. It has not yet been decided whether or not the flight will be competitive, but if so, the co-operation of the Royal Aero Club will be invited and suitable prizes offered, not only for the pilots, but also for the makers of the successful machines and engines. The route also, is still under consideration, and it is proposed to ask the Government to lend its aid where necessary.

AIRISMS FROM THE FOUR WINDS.

SPEED ! Speed !! Speed !!!

NEWS by telegram of the doings at the Peace Conference in Paris is apparently considered by the authorities altogether too slow. Therefore, a regular aeroplane service from Paris, which will be available for newspaper correspondents' dispatches twice daily, is under consideration.

ANOTHER instance of acceleration is that of a kinema film 100,000 ft. long, taken recently in London in the morning, which was conveyed to Paris by aeroplane and motor car, and the same evening shown there to an audience of American soldiers. A regular service of film delivery by aeroplane is now made three times a week, and a daily service is shortly to be instituted.

As last week we shrewdly surmised, there is to be another Aero Show in 1919, other than the indefinite one referred to, under the auspices of the S.M.M.T. The Aero Show of 1919 which promises to be of very vital importance is that which will be organised by the Society of British Aircraft Constructors, Ltd. We queried as to the holding of this and asked for an authoritative intimation upon the point. This we are glad to announce we have received from Mr. Charles V. Allen, the Secretary, writing from the offices of the S.B.A.C., 1 Albemarle Street. The aircraft industry is now of such hugely vast importance, both as an industry and as helping to govern the future of the British Empire, that it would certainly be invidious that such an important section of the

world's industry should be run as a "side show" of some society other than an associated body of the industry itself. For the moment we cannot give details of what the general scheme of the S.B.A.C. Show will be, but the unlimited possibilities can readily be imagined for a popular and at the same time highly instructive exhibition run under the auspices of a combination of the constructors themselves, at some advantageous spot within easy reach of not only Londoners, but all enthusiasts from all parts of the country, and for that matter the world. We look forward with very great interest to the further announcements emanating from the S.B.A.C. regarding their exhibition, which it is a foregone conclusion is likely to have more vogue during 1919 than any other show of the year.

By degrees the official figures are leaking out in regard to enemy air raids, one of the latest pieces of information issued being the number of air raids and bombardments from the sea by the Huns, upon the Isle of Thanet. From 1915 to 1918 (last Whitsuntide) this much "favoured" district underwent no less than 119 enemy attacks. Sooner or later no doubt we shall have a complete summary of the happenings in this respect, and the sooner official announcement can be made, if ever so brief a summary, of all the districts covered by each air raid, the better. It is certainly due, if only out of justice to those localities which innocently had to suffer for the rest of the country.

WHATEVER our own authorities may think of Zeppelin airships, judging by there being no mention of them in the terms of the armistice, America appears to regard the gas-bag with considerably more favour, as from America comes the news that Admiral Taylor, the naval constructor, and Capt. Steel, of the Naval Aviation, told the House that the Naval Committee had planned for the erection of 21 permanent coastal air stations, the building of war-planes, including a new powerful triplane, and the purchase of hundreds of dirigibles and other aircraft for the Navy. Capt Steel claimed that the invention of non-inflammable gas now made the use of the dirigible practicable. With that reservation there can be no question that the lighter-than-air craft must have a very high value in regard to military work, leaving out of the question altogether the importance, under certain limiting conditions, of the dirigible for commercial undertakings.

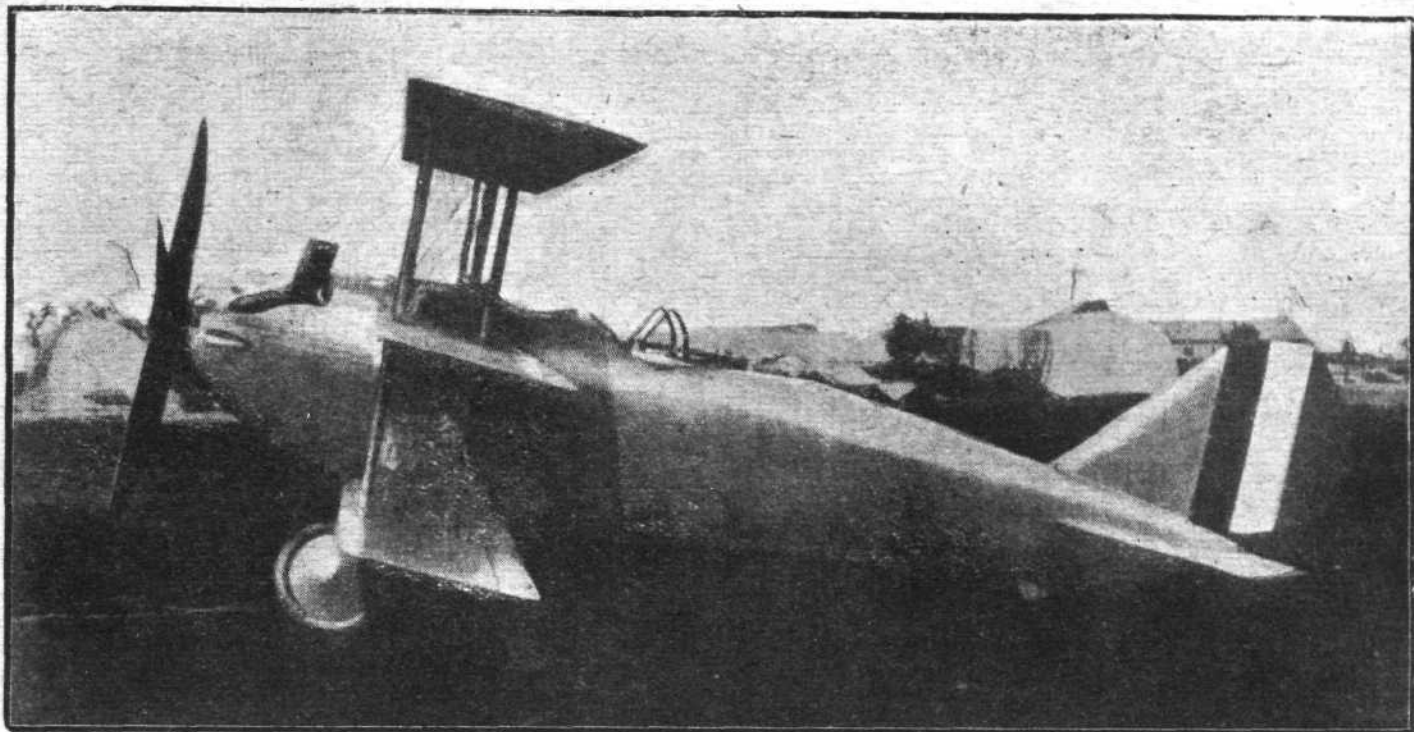
FROM the Washington War Departments comes another item of interesting news, in the announcement that several hundred aeroplanes have been released for the use of the mail service, which it is rather optimistically stated is to be extended to all cities in the country. Per contra it has been publicly stated that in this country no application has yet been received from the authorities that be, for permission to conduct an aerial post. Frankly we don't believe it. We should not be surprised to see definite denial of the statement.

It is not always necessarily a source for congratulation to see oneself through the eyes of another person. And so with nations. Mr. Roosevelt is one of those who have an ugly way of putting truths into straight language, and in his most recent comments upon the peace points of the U.S., he lays down some fairly startling figures which should make some folk think when assembled round the peace table. This is how Mr. Roosevelt views the war situation as it stood when the Armistice started its first lap :-

"America played in the closing months of the war a gallant part, but not in any way the leading part, and she played this part only by acting in the strictest agreement with our Allies, and under the joint High Command. She should take precisely the same attitude at the Peace Conference. We have lost in this war about 236,000 men killed and wounded. England and France have lost about 7,000,000. Italy and Belgium and the other Allies have doubtless lost 3,000,000 more. Of the terrible sacrifice which has enabled the Allies



Lieut.-Col. J. T. C. Moore-Brabazon, R.A.F., the adopted Parliamentary candidate for Rochester at the forthcoming election.



A PROMISING AMERICAN MACHINE.—The Curtiss-Kirkham triplane, which has, we are informed, put up some very excellent performances during her preliminary trials. Over a measured course an average speed of 160 m.p.h. was attained, while in another test an altitude of 26,300 ft. was reached.

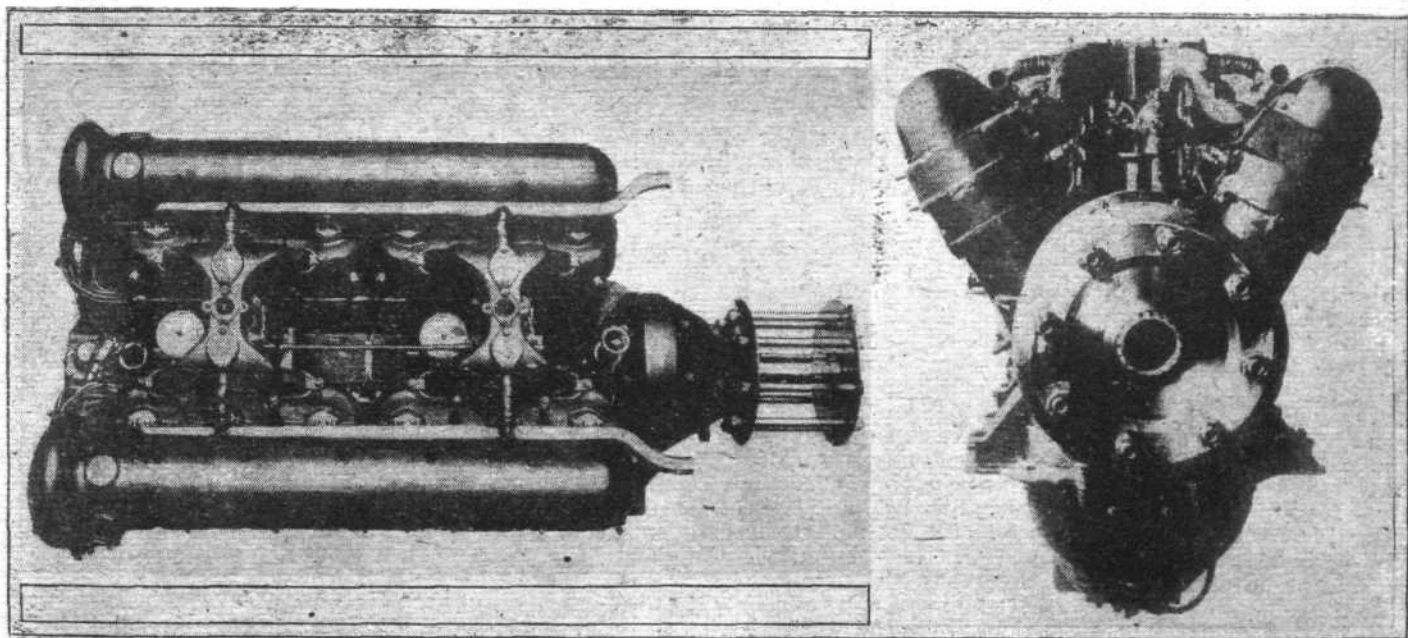
to win the victory America has contributed just about 2 per cent.

"At the end I believe our intervention was decisive, but the combatants were so equally matched and were so weakened by the terrible strain that our men and our enthusiasm and the million fighting men whom we got to the front, even although armed substantially with nothing but French field guns, tanks, machine guns, and aeroplanes, were decisive in the scale. But we could render this decisive aid only because for four years the Allies, in keeping Germany from conquering their own countries, had incidentally kept her from conquering ours.

"It is our business to act with our Allies and to show an undivided front with them against any move of our late enemies. Let it be clearly understood that the American people absolutely stand behind France, England, Italy, Belgium, and the other Allies at the Peace Conference."

The trouble this side, however, is that a good many think that the point with the American people is that they should stand in front of France, England, etc., and not behind.

ORDINARY politics are wide of the objects of a paper of the character of "FLIGHT," but with the present-day upheavals there are many outrages perpetrated in the name of politics which have no concern whatever with politics, but which do concern all sane inhabitants of this globe. By way of instance there is Bolshevism, which is sheer anarchy, carrying with it nothing but destruction, murder, and the wiping out of every human virtue for which the great world-war has been fought. The majority of thinking Labour representatives full well realise this, and probably there is no man who has got its measure more accurately and sanely than Mr. G. N. Barnes, who has fought, and continues to fight, so well for the true labour man. If only the responsible amongst the

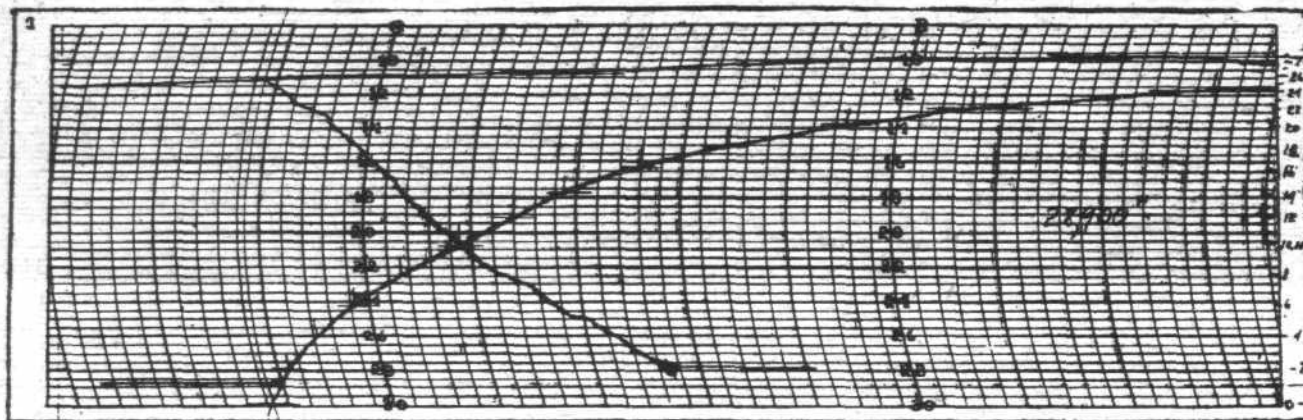


THE CURTISS-KIRKHAM AEROPLANE ENGINE.—This engine was used in the triplane illustrated in another photograph. Few particulars of it are available as yet, but we understand that this engine develops over 400 h.p. and weighs only 650 lbs. One of the features is that the propeller shaft is built integral with the reduction gear.

Labour members rally round Mr. Barnes, they will indeed have a glorious future before them, and a future which need not necessarily mean other than a brilliant future also for the other classes of the community, who at least should be allowed to exist as helping to make up a homogeneous whole. Mr. Barnes is one of those men who on no association of employers would ever regret seeing very high up in power, as his views are constructively sound—in fact magnificently sound. And he has no respect for that very small minority which so blatantly attacks everything outside their own particular section, and have but one motto—down with everything, destroy everything—except them and theirs. The following very straight “explanation” from Mr. Barnes, which he gave last week-end at the opening of his campaign at Glasgow, is one that should favourably commend itself to every elector as being sound reasoning, as against the red flag madness which, so raucously insisted upon by some

It certainly does seem a pity that Berlin was not afforded an opportunity of that firework show on November 9th, Lord Mayor's Day, which was so carefully prepared for with a little bunch of Handley-Page bombing machines. Wonder if the Hun powers that were then still in existence had an inkling of its postponement to the 11th and got over the difficulty by seeing that the Armistice was signed by five o'clock in the morning of that day? One's only regret is that the squadron had not started at three in the morning. You never know, their wireless *might* then have got out of order and not been able to receive any bothering messages in regard to “Armistice Signed.”

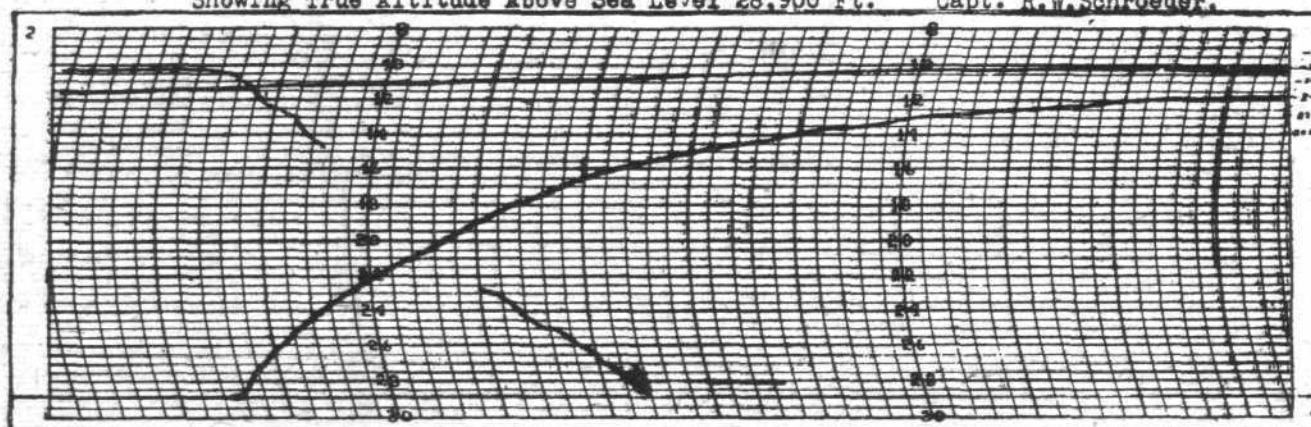
In Mr. Stuart A. Hirst aviation has a good advocate for the Midlands. Foreseeing what is going to happen within the next few years, he has been urging the Council of the



Ceiling, Bristol U.S.B-1
Propeller X5409
Temperature 19°Cent

300 H.P. Hispano-Suiza
Barometer 28.85
Sept. 18th 1918

Showing True Altitude Above Sea Level 28,900 Ft. Capt. R.W. Schroeder.



A barograph record of the record altitude flight of Major Schroeder, whose own story of the flight was published in “FLIGHT” recently. The machine used was, we understand, an American-built Bristol fighter, fitted with a 300 h.p. Hispano engine.

Bolshevist wrecking would-be representatives of the people—or to call them by their correct name, the extremists—who respect nothing, including themselves. The following is Mr. Barnes' little statement and query:—

“People thought he had left the Labour Party because of a resolution passed a week or two ago calling the Labour Ministers out of the Government. Nothing of the kind. He had left it before, because John Maclean had come into the constituency as a Bolshevist candidate against the policy for which he (the speaker) was acting on behalf of the Labour Party. It would have been cowardly on his part had he run away and left the field to Bolsheviks. He was profoundly apprehensive of the evils and dangers of Bolshevism, and he was going to do all he could to combat it. Therefore, if anyone were disposed to label him or call upon him to label himself he wanted nothing better than to be called ‘Anti-Bolshevist.’ Bolshevism meant the pulling down of the pillars of society. He wanted to build up. He left it to the Labour Party to say how they accounted for the fact that, while the leaders of the Labour Party were anti-Bolsheviks, John Maclean was being run as a Labour candidate.”

Leeds Chamber of Commerce to take such steps that Leeds may have apportioned to it one of the great international air stations which are sure to be springing up in England and throughout the world. It may appear to be a little premature, but Mr. Hirst is right, and Leeds' importance is the more outstanding from the fact that it stands midway between London and Scotland. When the selection for the main air stations is made, the result is likely to have very far-reaching beneficial effects upon the district. It is to be hoped that the same want of vision which in the early railway era compelled the placing of one of the main London and North-Western Railway stations a certain prescribed distance from a leading Midland town, may not be repeated in regard to aviation stations. That Midland town, or rather its bigwigs who ran it and were so fearful lest such a horrible thing as a railway station dumped near the centre of the town should do harm to their particular town lots, lived to regret their inadvisable decision just once, and that was for all their life. Folk have often wondered why that railway station is so awkwardly placed, but the central inhabitants know the reason.



Casualties

Capt. DUNCAN RONALD GORDON MACKAY, 55th Squadron, R.A.F., late of 13th A. and S.H. and 19th R.F. (U.P.S.), who died on November 11th (a prisoner of war) in France, of wounds received while leading a raid the previous day, was the younger son of the late Duncan L. M. Mackay, I.C.S. (retired), and Mrs. Mackay, Burnt House, Speldhurst, Kent. His age was 23.

Capt. WILLIAM GEOFFREY WALFORD, R.M.R.E. and R.A.F., who was killed in action on November 4th, in aerial combat over the German lines, was the eldest son of Capt. William Walford, of Glanmonnow, Garway, Hereford.

Lieut. J. W. WARNER, R.A.F., reported missing on October 4th, now reported killed in action, aged 19, was the only son of Mr. and Mrs. C. Warner, of Thorparch, Yorkshire. He had been awarded the Distinguished Flying Cross, and was officially credited with destroying eight enemy machines and shooting three others down out of control. He went to France last May with the squadron commanded by Col. Bishop, V.C., D.S.O., M.C., D.F.C.

Lieut. J. E. CHILD, R.A.F., who died of pneumonia following influenza, at Lees Court Military Hospital, Faversham, on November 3rd, was the eldest son of Mr. and Mrs. T. H. Child, of Leytonstone, and brother of the late Capt. J. M. Child, M.C., R.A.F. He was in the Territorial Artillery for seven years before the outbreak of war, and served with them until February, 1917, when he transferred to the R.F.C. He saw service in France and Italy, and came to England last August for a rest. He was posted to Throwley Aerodrome, Faversham, as one of the instructors, and while there contracted influenza, which resulted in his death. He leaves a widow.

Capt. CHARLES S. COLTSON, D.S.C., R.A.F., who died on November 25th of pneumonia at the Military Hospital, Devonport, was the son of Mrs. Reid, of Blenheim, Colchester. He was educated first at the Abbey School, Beckenham. In September, 1909, at the age of 12½, he entered the Royal Naval College, Osborne, and in September, 1911, he went on to Dartmouth, where he became chief cadet captain, and received the King's Gold Medal. He passed out fourth in September, 1913, and then joined H.M.S. "Cumberland" for a six months' cruise, and was chosen to receive the presentation dirk given to the cadet considered to have the best all-round influence and abilities. In March, 1913, he was appointed midshipman in H.M.S. "Hibernia" (flagship), and served with the Grand Fleet for two years. In May, 1915, he was lent to the R.N.A.S. for special services, being stationed at Roehampton, Marquise, France, and Kingsnorth. In March, 1916, being promoted flight sub-lieut. and sub-lieut. R.N., he was sent to Milton, Pembroke. He was promoted flight lieut. in December, 1916, having been twice thanked by the Admiralty for valuable services rendered, and in October, 1917, he was awarded the D.S.C. In November, 1917, he was appointed to the R.N. air station, Mullion. In March he was promoted lieutenant R.M., and in April to captain R.A.F., and sent to R.A.F. Headquarters, Plymouth, for staff work, which appointment he still held at the time of his death. Although only just 22 years old at the time of his death, he held the second highest "record" in the Airship Service, having flown for 1,800 hours.

Capt. FRANCIS HERBERT HODGSON, R.A.F., who was accidentally killed on November 19th at Elincourt, was the younger son of Mr. C. H. Hodgson, of Sherborne School. Capt. Hodgson was born on March 11th, 1896, and educated at Connaught House, Weymouth, and at Harrow School, winning an entrance scholarship in 1910 and the Roundell Scholarship in 1914. He won a Science Demyship at Magdalen College, Oxford, and went up in October, 1914. Intending to be a doctor, he started his medical training at St. Mary's Hospital in the summer of 1915, but joined Beatty's Flying School at Hendon in October, and on obtaining his certificate received a commission in the R.F.C. in January, 1916. Train-

ing at Brooklands and Croydon, he got his wings, and went to France in May, 1916, and acted as a pilot on artillery reconnaissance. In September he was severely wounded by a Fokker while on a bombing expedition. He was employed at Oxford during convalescence, and returned to France in June, 1917, where he served continuously till last May, being mentioned in despatches in February. He was sent to Cambridge in May for a staff course, and was offered a staff billet; but in October, at his own urgent request and that of his comrades in France, he returned to the front. He was slightly wounded on November 4th, but did not leave his squadron, and was flying over the German lines at the moment of the armistice. At the time of his death he had just been appointed to command an Independent flight of Bristol fighters to accompany the Army of Occupation to Germany.

Capt. ARTHUR MAUGHAN HUMBLE-CROFTS, who died of pneumonia on November 19th, at the Military Hospital, Castle Mount, Dover, was the fourth son of Prebendary and Mrs. Humble-Crofts, and was born at Waldron Rectory, Sussex, in 1883. Educated at Eastbourne College and Keble College, Oxford, he joined the R.N.A.S. in 1915 as an A.B., and worked in the Admiralty Offices. In November, 1916, he got his commission, and was sent to Tynemouth, becoming lieutenant, R.N.V.R., in May, 1917. In the following August he went to Dover, and was working in part charge of the Naval Exchange for the R.A.F. at the time of his death. He married, in 1910, Miss Margaret Cooper.

Married

Capt. C. O. BEAN, R.A.F., elder son of Mr. and Mrs. C. R. Bean, Swanage, was married on October 18th at St. Wilfred's, Scrooby, Bawtry, to MABEL ("MAB") youngest daughter of Mr. and Mrs. CHARLIE CLARK, Retford.

Lieut. LIONEL FALCK, R.A.F., was married on November 23rd at St. Michael's Church, Aylsham, Norfolk, to KATHLEEN CONSTANCE, youngest daughter of Mr. and Mrs. W. F. STARLING, of Cedar House, Aylsham, Norfolk.

Lieut. HAROLD KENNETH GIBSON, 3rd Tyneside Scottish, attached R.A.F., youngest son of the late A. E. Gibson, Esq., and Mrs. Gibson, of Newcastle, was married on November 27th at the Parish Church, Henley-on-Thames, to ELEANOR MARY, elder daughter of Dr. and Mrs. GEORGE SMITH, of Longlands, Henley-on-Thames.

Capitaine EUGÈNE BOBINI, observateur en avion, Croix de Guerre and Valeur Militaire, was married on November 18th at the Church of St. Joseph, Avenue Hoche, Paris, to EILEEN, younger daughter of Mr. D. HASTINGS IRWIN.

Major FREDERICK DENHAM TILL, Squadron Commander, R.A.F., of Ceylon, eldest son of Mr. and Mrs. Louis Till, of Twickenham, was married on November 23rd, at St. Mary's, Poole, to ELIZABETH NESTA, youngest daughter of the late Rev. THOMAS JOHNS and Mrs. Johns, of Manor Owen, Pembrokeshire.

To be Married

The marriage between Capt. G. H. B. STREATFIELD, M.C., R.A.F., younger son of Major and Mrs. Hugh Streatfield, of Ryhope, Co. Durham, and Barlay, Balmaclellan, Kirkcudbrightshire, and MARJORIE, younger daughter of Mr. and Mrs. CHARLES BOOTH, of 10, St. Bede's Terrace, Sunderland, will take place at Holy Trinity Church, Brompton, on December 11th, at 1.45.

Item

Mr. C. F. Spilhaus will be extremely grateful for any information regarding the fate of his son, Lieut. JACK A. SPILHAUS, R.A.F., who was reported missing on September 4th, and was last seen over Escaillon Aerodrome, seven miles east of Douai. Letters should be addressed care of F.D.B., 110, Cannon Street, E.C. 4.

Lord Weir, Secretary of State for the Royal Air Force, and Major-General Sykes, Chief of the Air Staff, were among those present at Charing Cross Station on Sunday to welcome Marshal Foch.

THE ROYAL AIR FORCE

London Gazette, November 26th.

The following temp. appointments are made at the Air Ministry :—
Staff Officers, 1st Class.—T. B. Wood, C.M.G. (Col. in Army), and is granted a temp. commn. as Col.; June 22nd, seniority from April 1st (substituted for notification in *Gazette* July 9th). And to be actg. Lieut.-Cols. if not already holding that rank :—H. E. Day, D.S.O., M.V.O. (Maj., R.E.), and is granted a temp. commn. as Maj.; Oct. 14th, seniority from April 1st. Maj. (actg. Lieut.-Col.) H. A. R. Aubrey, M.C.; Nov. 11th.

Staff Officers, 2nd Class.—And to retain the actg. rank of Maj. whilst so employed :—Capt. (actg. Maj.) W. B. Adams; Nov. 6th. Capt. (actg. Maj.) J. H. S. Annesley; Nov. 13th.

Staff Officers, 3rd Class.—Lieut. (actg. Capt.) E. E. Colquhoun, and to retain the actg. rank of Capt. while so employed; Nov. 15th. (T.) F. V. Stillingfleet (Temp. Capt., R.E.), and is granted a temp. commn. as Capt.; April 1st.

Staff Officer, 4th Class.—Capt. E. Cameron, vice Lieut. J. Duncan; Nov. 15th.

The following temporary appointments are made :—

Staff Officers, 3rd Class.—And to be actg. Capt. whilst so employed, if not already holding that rank :—P. C. Carr (Temp. Capt., Spec. List) and is granted a temp. commn. as Capt., with seniority from April 1st. St. B. Goldsmith, M.C. (Temp. Lieut., R.E.), and is granted a temp. commn. as Lieut., with seniority from April 1st; Oct. 11th. Lieut. F. W. Memory; Nov. 11th.

Flying Branch.

Capt. A. T. Williams to be actg. Maj. whilst employed as Maj. (A.); Oct. 28th.

Capt. (actg. Maj.) J. S. D. Berrington to be graded for pay as Maj. whilst employed as Maj. (K.B.); Oct. 10th.

Capt. L. Ritson to be graded for pay as Capt. (O.) whilst employed as Instructor; Sept. 26th.

Lieuts. to be actg. Capt. whilst employed as Capt. (A.) :—R. W. Dobbie, A.F.C.; Oct. 24th. F. F. Wessel; Nov. 8th. G. N. Blennerhassett, R. F. H. Norman, A. C. Sanderson; Nov. 11th. A. Sleep; Nov. 14th. L. N. Hollinghurst, D.F.C.; Nov. 18th. Sec. Lieut. N. Cooper to be actg. Capt. whilst employed as Capt.; (A.) Nov. 18th. Sec. Lieut. (Hon. Capt.) W. A. Moore to be graded for pay as S.O. 2, whilst specially employed; Oct. 17th.

Lieuts. to be Lieuts. (A.), from Observer Officers :—J. M. Bright; April 9th. R. G. Torrance; June 27th. J. B. Hall; July 12th. E. Rhodes; Aug. 2nd. K. W. Mackeehan; Aug. 30th. R. A. Tarleton; Sept. 1st. A. Leach, M.C.; Oct. 25th. W. C. Thompson, K. Norwood; Oct. 26th. G. B. Pershouse, W. R. Baker; Oct. 28th. J. S. Millar; Oct. 29th. F. W. Cundiff, G. H. Bennett, F. W. Thomas, J. W. Baker; Oct. 21st. R. S. Mackenzie; Nov. 3rd. M. H. Scott; Nov. 4th. A. C. Thornton; Nov. 6th. M. A. S. Vaile; Nov. 9th.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their ranks as Sec. Lieuts. (A.) :—R. H. M. Sheppard; May 28th. G. Roberts; July 18th. H. G. Bennett; July 26th. W. J. Millen; July 29th. H. A. Bartlett; Aug. 13th. C. A. Holt; Aug. 14th. G. W. Sweeney; Aug. 10th. J. B. Edwards; Aug. 21st. W. H. S. Davis; Aug. 30th. F. C. Ward; Sept. 8th. F. W. Savignac; Sept. 28th. M. G. Van de Water; Oct. 8th. L. M. Hall; Oct. 20th. E. N. Strain; Oct. 23rd. R. G. Kirk, N. Hickson; Oct. 25th. K. B. Terry; Oct. 26th. P. H. Lambert, H. M. Best, N. S. Todd; Oct. 27th. G. A. R. Mergard, C. W. Dicks, T. R. Nichols, T. A. Hopkinson, L. B. Jordan, S. D. Hutchinson, E. O. W. Matthews; Oct. 28th. J. A. McAlpine, P. H. Perkins, S. H. West, J. H. Marland, C. C. Holy, J. Mackintosh, J. Evans, A. Swindale, P. Alderton, J. Baird; Oct. 29th. W. D. Moffatt, W. K. Buchan, R. Holman, C. P. Bertoli, J. Golman, G. L. Blagrove, J. G. Barclay, H. A. Campbell; Oct. 30th. C. G. Nettleton, I. J. Sankey, L. G. Woolhouse, W. E. Cook, W. E. Blackett, E. A. O. Simpson, S. W. Beckett, D. G. Rogers, W. E. Purdy; Oct. 31st. J. H. Young, T. A. Davidson, A. R. C. Greene; Nov. 1st. W. E. Blake; Nov. 2nd. D. I. Walker; Nov. 4th. H. R. Tylor, H. Rhodes, R. Clark, J. Ker; Nov. 5th. T. Searle, J. W. Hill, T. B. Alexander; Nov. 6th. J. R. McKell, C. H. Jehan, D. R. Pettigrew, K. W. Crosby; Nov. 7th. A. Laver; Nov. 9th.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (A.) :—184931 H. W. Kelly; May 18th. 137987 A. E. Jones; May 28th. 137980 W. E. Eastman, 137985 J. Holthouse, 137999 C. R. Stewart, 137977 J. W. Chadwick, 137981 R. P. Gain, 137990 N. E. Mustoe, 185000 G. W. Wollaston; May 29th. 138000 G. D. Wilson, 137979 J. Duminy; June 11th. 110840 H. N. Hawker; June 28th. 137993 W. G. Nicholson; June 29th. 184950 E. McConnell, 184914 J. D. C. B. Furley, 184964 C. Rayner, 184920 B. K. Hartley, 184885 J. D. Bosman, 184911 C. J. Fleming, 184913 A. L. Frank, 184947 H. V. Martin, 184971 F. J. Scheepers, 184892 W. S. Cooper, 184963 R. Ralton, 184909 W. Fenwick, 184974 R. H. Shutt, 184915 J. B. Geyer, 184961 C. A. Pienaar; July 23rd. 110866 E. J. Orr; July 29th. 184969 D. M. Ryan; Aug. 6th. 184985 H. W. Van Der Merwe, 137996 M. G. S. Parker, 184988 F. B. Wasserfall, 184975 L. Smith, 184993 L. B. Wiley, 184962 D. M. Pretorius, 184952 E. W. T. Meesor, 184883 P. C. C. Blair-Hook, 184924 J. B. Hodgson, 184930 P. S. Joubert, 184928 O. C. Jensen, 184929 F. N. Joubert, 184949 A. C. McIntosh, 110904 J. Woods; 184951 R. R. Mackenzie, 184937 A. L. Koller, 184935 A. W. P. Kieser, 184893 R. Courtney, 184902 J. B. Downing, 184955 W. H. Morris, 184905 J. D. R. Eedes, 184922 H. R. Herbert; Aug. 8th. 184986 A. G. Waite; Aug. 14th. 184925 W. I. Holmes, 110795 P. Brodie, 184881 A. S. Bottom, 184899 G. S. Deighton, 184944 G. J. Malherbe, 184968 D. J. Roos; Aug. 23rd. 184919 B. R. Hartley, 184895 C. C. Cuff, 184945 E. O. Maritz, 184886 C. E. Bouchier, 184934 T. D. Keavy, 184898 J. P. J. de Bruyn, 184917 R. G. Granier, 184973 F. M. Seabourne, 184987 E. B. Ward, 184891 G. M. Campbell, 184977 O. R. Steen, 184918 L. W. Hartley, 184990 A. S. Webb, 184903 J. O. S. Driver; Sept. 1st. 184921 E. Heimann; Sept. 7th. 184908 H. W. Featherstonehaugh, 184933 J. D. B. Kemsley, 184954 J. T. Molteno, 184958 W. E. Passmore, 184932 T. J. Kelly; Sept. 9th. 184966 C. R. Rees-Gibbs, 184926 T. A. F. Jackson, 184922 L. Weinberg, 184957 W. R. Parkins, 110826 C. W. Gillies; Sept. 16th. 184970 F. R. Salomon, 184906 A. V. Elston, 184994 H. G. Willmott, 179122 G. M. Edwards, 179124 A. J. P. Hall, 179127 J. L. Pollock; Sept. 19th. 184965 O. Rees, 184936 E. T. A. Keitzman, 184904 T. Dunn; Sept. 26th. 60760 W. Denham, 881797 R. O. Reynolds; Sept. 30th. 179125 R. M. Houston; Oct. 2nd. 179129 L. H. E. Whitaker, 011349 T. A. Patterson, 110903 E. A. F. Wilding, 24584 A. Ellis, H/260185 R. C. Teakle; Oct. 3rd. 11981 G. W. Vint, 100350 R. S. Sargent, 201466 H. S. Strange (since deceased); Oct. 5th. 200628 D. A. Jones, 376 M. R. Haseler, 201928 while in G. Addison; Oct. 6th. 11693 D. Leech; Oct. 7th. 179128 R. Isaacs; Oct. 12th.

John Mac following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed rank as Sec. Lieuts. (Obs. Officers) :—G. F. Sharp; May 21st. A. G. E. Thomson; Aug. 1st. K. W. Dunmore; Aug. 9th. A. G. Dick-

inson; Aug. 29th. S. Hodges; Oct. 24th. A. H. Ramage; Oct. 28th. C. M. Sherlock, A. McL. Blain; Oct. 31st.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (Obs. Officers) :—184999 J. L. H. Wright; June 11th. 184910 H. B. Fisk 184967 L. L. Rivas; July 23rd. 184938 G. Kreser; Aug. 8th. 184923 P. A. Herbert; Sept. 1st. G/26662 C. B. Branson, 1581 A. Parsons, 129648 H. H. Small; Oct. 8th.

The following Lieuts. relinquish their commns. on ceasing to be employed : H. Simonis; May 17th. (Hon. Capt.) T. R. G. Marshall (Capt., A.S.C.); Oct. 17th.

Maj. P. R. Grace relinquishes his commn. on account of ill-health, and is granted the hon. rank of Maj.; Nov. 27th.

The following Lieuts. relinquish their commns. on account of ill-health, and are granted the hon. rank of Lieut. :—R. L. Bewell, W. L. Culverwell (caused by wounds), F. E. Dixon, J. T. Gartside (contracted on active service), C. R. Lee, G. I. D. Marks, H. Orchard (contracted on active service), A. R. Whitten; Nov. 27th.

The following Lieuts. relinquish their commns. on account of ill-health :—H. F. Evans (Lieut., R.H.A., T.F.) (caused by wounds), P. F. Heppell (Lieut., R.F.A., T.F.) (caused by wounds), N. L. Moon (Lieut., Hrs.) (contracted on active service), S. McKercher (Lieut., Can. Local Forces); Nov. 27th.

The following relinquish their commns., being physically unsuited for the duties of pilots or observers :—Sec. Lieut. W. Doyle, Lieut. L. Jolly; Nov. 27th.

Sec. Lieut. G. P. S. Sanday relinquishes his commn. on account of ill-health and is granted the hon. rank of Sec. Lieut.; Aug. 24th.

Sec. Lieut. R. Morton (Sec. Lieut., Bord. R.) relinquishes his commn. on account of ill-health; Nov. 27th.

The surname of Lieut. (actg. Capt.) G. E. Brookes is as now described, and not as in *Gazette* Oct. 22nd.

The surname of Flight Cadet H. P. Gardner is as now described, and not as in *Gazette* Sept. 3rd.

The notification in *Gazette* Nov. 15th concerning Flight Cadet B. J. Hill is cancelled.

The notification in *Gazette* Oct. 29th concerning Flight Cadet J. A. P. Hunt is cancelled.

Administrative Branch.

Lieut. (Hon. Capt.) A. E. Miller, M.C., to be actg. Maj. while employed as Maj.; Nov. 3rd.

Capt. J. S. Michie, M.C., to be Capt., from (A); Aug. 6th. (Substituted for notification in *Gazette* Aug. 27th.)

Capt. (T.) to be Capt. :—P. P. Capelli; Oct. 28th. H. E. Earl; Nov. 4th. A. A. Gawn (Hon. Capt., A.P.D. ret. pay) is granted a temp. commn. as Capt.; Oct. 1st (substituted for notification in *Gazette*, Oct. 25th).

Lieuts. to be actg. Capt. while employed as Capt. :—F. Robinson; June 30th. A. G. Knight, D.S.O., M.C., R. Leake, W. J. O. Newton; July 11th. H. C. Vickery; July 27th. A. S. H. O'Brien; Oct. 29th.

Sec. Lieuts. (T.) to be actg. Capt. while employed as Capt. :—J. Woolfenden; Oct. 1st. (Hon. Capt.) J. D. Fitzgerald; Oct. 29th.

The following are granted temp. commns. as Lieuts., seniority April 1st : F. C. McBride (Capt., Lond. R., T.F.), and to be Hon. Capt.; Sept. 30th. J. Illingworth (Temp. Lieut., Lanc. Fus.); Nov. 9th. B. W. Blower (Lieut., Shrops. L.I., T.F.); Nov. 14th.

The following are granted temp. commns. as Lieuts. :—W. Pritchard, M.C. (Hon. Lieut., and Temp. Qrmr.); Oct. 14th. B. Booth (Lieut. and Qrmr., Labour Corps); Nov. 12th.

Lieuts. (A.) to be Lieuts. :—(Actg. Capt.) E. E. Hardie; Nov. 6th. C. F. Cowper; Nov. 9th. (Substituted for notification in *Gazette* Nov. 19th.) D. F. Stiven; Nov. 12th. E. L. Heyworth; Nov. 14th. (Hon. Capt.) H. G. Southon, A. Swinglehurst; Nov. 16th.

Lieut. M. E. Staples to be Lieut., from (K.B.); July 13th.

Lieuts. (O.) to be Lieuts. :—J. P. Cunningham, J. N. Stennett; Nov. 7th. W. W. Glenn, M.C.; Nov. 14th. E. W. Keep; Nov. 16th.

Sec. Lieut. H. R. Edwards (R.F.A.) is granted a temp. commn. as Sec. Lieut.; Nov. 15th (seniority from April 1st, and to be actg. Lieut. while employed as Lieut.).

Sec. Lieuts. to be actg. while employed as Lieuts. :—W. Fell, from (T.); Oct. 1st. J. A. Armstrong, from (T.); Oct. 28th. J. G. Le Brun, from (T.), (Hon. Lieut.) J. S. Craig; Oct. 31st.

Sec. Lieut. A. H. Black (late Gen. List, R.F.A., on prob.) is confirmed in his rank as Sec. Lieut.; June 7th.

C. White is granted a temp. commn. as Sec. Lieut.; Nov. 14th.

The following relinquish their commns. on ceasing to be employed :—Lieut. L. G. Bacon; April 8th. Capt. C. Perrett; Nov. 14th. Lieut. (Hon. Capt.) M. Jubb (Capt., W. Rid. R., T.F.); Nov. 16th.

Lieut. J. B. Sidebotham (Lieut., R.E., T.F.) relinquishes his commn. at his own request; Nov. 27th.

Lieut. (actg. Capt.) W. H. T. Collings (Lieut., K.R.R.C.) relinquishes his commn. on account of ill-health; Nov. 27th.

Sec. Lieut. J. W. Whitehead relinquishes his commn. on account of ill-health, and is granted the hon. rank of Sec. Lieut.; Nov. 27th.

Sec. Lieut. (Hon. Lieut.) A. L. G. Young (Lieut., Lond. R.) relinquishes his commn. on account of ill-health contracted on active service; Nov. 27th.

Sec. Lieut. F. S. Coates resigns his commn.; Nov. 27th.

Sec. Lieut. L. J. Hurst resigns his commn., being physically unsuited for the duties of pilot or observer; Nov. 27th.

The notifications in *Gazette* May 21st concerning Lieut. (actg. Capt.) H. E. Pooley and Lieut. E. Edwards are cancelled.

The notification in *Gazette*, Nov. 12th, concerning Lieut. (Hon. Capt.) E. F. G. Thomson is cancelled.

Technical Branch.

Capt. J. W. Francis to be actg. Maj., from (A.); Oct. 12th.

Capt. to be actg. Maj. while employed as Maj. (Grade B) :—C. G. More; Oct. 15th. W. Wade; Nov. 1st.

Sec. Lieut. (actg. Capt.) J. I. Thompson retains the actg. rank of Capt., while employed as Capt. (Grade B), from (Ad.); Nov. 20th.

Lieuts. to be actg. Capt. while employed as Capt. (Grade A) :—H. N. Charles; Oct. 19th. F. W. Clarke; Nov. 1st. A. L. Hyslop; Nov. 6th.

Sec. Lieuts. to be actg. Capt. while employed as Capt. (Grade A) :—D. M. Rees; Oct. 30th. (Actg. Lieut.) B. P. K. Walsh, (actg. Lieut.) J. G. Wright; Nov. 1st.

To be actg. Capt. while employed as Capt. (Grade B) :—Sec. Lieut. (actg. Lieut.) H. J. Skingle; July 9th. Lieut. F. Hickman; Oct. 28th. Sec. Lieut. J. Sutherland; Oct. 30th.

Lieuts. to be Lieuts. (Grade A) :—J. V. Kynaston, from (A.); Sept. 24th. M. E. Staples, from Ad.; Oct. 31st. G. M. Guillon, from (O.); Nov. 1st. Lieut. C. M. Kelly to be Lieut. (Grade B), from (A); Oct. 7th. Lieut. V. G.

Darrington (R.F.A., S.R.) is granted a temp. commn. as Lieut.; Nov. 5th, seniority April 1st.

Sec. Lieuts. to be actg. Lieuts. while employed as Lieuts. (Grade A):—A. Bolton, R. T. Saunt; July 9th. W. H. Preston, D.C.M.; Aug. 14th. A. V. Boothroyd; Aug. 20th. A. A. Gardner; Oct. 1st. W. H. Dowling; Oct. 30th. J. Driscoll, J. C. Ferguson, J. S. Hilton, from (Ad.), P. G. May, J. G. Peacock, H. Robinson; Nov. 1st.

Sec. Lieuts. to be actg. Lieuts. while employed as Lieuts. (Grade B):—S. E. White, from (Ad.); Oct. 31st. T. A. Burns (Hon. Lieut.) P. M. Greenwood, from (Ad.), P. E. Miles, from (Ad.); Nov. 1st. D. H. Baylis; Nov. 14th. (Hon. Lieut.) W. Hardcastle; Nov. 20th.

The following relinquish their commns. on ceasing to be employed:—Capt. O. G. Wemyss; Oct. 31st. Lieut. F. A. Klipsch (Lieut., T.F., Res. Gen. List); Nov. 26th.

Capt. W. H. R. Whittet, M.C., relinquishes his commn. on account of ill-health, and is granted the hon. rank of Capt.; Nov. 27th.

Lieut. (actg. Capt.) F. B. Bayly relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Capt.; Nov. 27th.

Sec. Lieut. (Hon. Lieut.) T. N. Glover relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Lieut.; Nov. 27th.

Sec. Lieut. W. E. Arscott relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Sec. Lieut.; Nov. 27th.

The date of appointment of Sec. Lieut. (actg. Capt.) E. G. Herbert is Aug. 19th, and not as in *Gazette* Nov. 12th.

The date of appointment of Sec. Lieut. (actg. Lieut.) R. J. Wallace is April 29th, and not as in *Gazette* Oct. 22nd.

Medical Branch.

T. D. C. Barry (Lieut.-Col., R.A.M.C.) is granted a temp. commn. as Lieut.-Col.; June 1st, seniority from April 1st.

The following are granted temp. commns. as Lieut.-Cols.; Oct. 1st, seniority from April 1st:—H. E. South (Fleet Surg., R.N.); H. J. Hadden (Fleet Surgeon, R.N.); T. Philip (Lieut.-Col., R.A.M.C., T.F.); E. C. Cridland (Fleet Surg., R.N.); E. O. B. Carberry (Fleet Surg., R.N.); N. H. Harris (Fleet Surg., R.N.); G. N. Biggs (Maj., actg. Lieut.-Col., R.A.M.C.).

The following are granted temp. commns. as Maj. (Oct. 1st, seniority from April 1st):—R. R. Faxon (Staff Surg., R.N.); G. D. Bateman (Staff Surg., R.N.); A. W. Iredell (Staff Surg., R.N.); B. R. Bickford, D.S.O. (Staff Surg., R.N.); C. F. Bainbridge (Staff Surg., R.N.); J. D. Keir (Staff Surg., R.N.); R. H. McGiffen (Staff Surg., R.N.); E. M. Hearn (Staff Surg., R.N.); L. L. Greig (Staff Surg., R.N.); E. G. R. Lithgow (Maj., R.A.M.C.); A. H. Hogarth (Maj., R.A.M.C., T.F.); W. G. Mitchell (Maj., R.A.M.C.); A. Fairley (Staff Surg., R.N.).

The following are granted temp. commns. as Capt. (Oct. 1st, seniority April 1st):—A. MacLennan (Capt., R.A.M.C., T.F.), H. R. B. Hull (Surg., R.N.), C. J. G. Taylor (Surg., R.N.V.R.), J. M. Kirkness (Capt., R.A.M.C., T.F.), A. E. Panter (Permit. Surg., R.N.), A. R. Sharrod (Surg., R.N.), W. Darling, M.C. (Capt., R.A.M.C., S.R.), E. P. Punch (Surg., R.N.V.R.), E. J. Boyd (Surg., R.N.), S. Robertson (Surg., R.N.), P. M. Keane (Surg., R.N.), H. G. Sutherland (Surg., R.N.), R. S. Overton (Surg., R.N.), H. W. Scott (Surg., R.N.), R. G. Lyster (Surg., R.N.), J. C. Hall (Capt., R.A.M.C.), N. C. Bazett, M.C. (Capt., R.A.M.C., S.R.), W. A. Pocock (Surg., R.N.), H. S. Baker (Capt., R.A.M.C., S.R.), V. A. Playne, D.S.O. (Surg., R.N.), J. Rothwell (Surg., R.N.), H. G. Anderson (Surg., R.N.), R. H. Knowles (Surg., R.N.), A. A. Atkinson (Capt., R.A.M.C., S.R.), F. C. Kempson (Capt., R.A.M.C., T.F.), J. A. Parsons (Capt., R.A.M.C., T.F.), R. E. Bell (Capt., R.A.M.C., S.R.), K. Biggs (Capt., R.A.M.C., S.R.), J. P. N. Casey (Capt., R.A.M.C., T.F.), N. F. Lloyd (Surg., R.N.), R. D. Goldie (Capt., R.A.M.C., S.R.), J. O. Watson (Surg., R.N.), W. H. H. Bennett (Capt., R.A.M.C., T.F.), W. G. Robertson (Surg., R.N.), G. W. Clarke (Capt., R.A.M.C.), J. C. H. Allen (Surg., R.N.), J. P. Walker (Surg., R.N.), A. Scott-Turner (Capt., R.A.M.C., T.F.), C. H. Browne (Surg., R.N.), G. H. Latham (Surg., R.N.), J. Allen (Surg., R.N.), V. Magee (Surg., R.N.), I. L. Waddell (Capt., R.A.M.C., S.R.), J. R. Adam (Surg., R.N.), E. Heffernan (Surg., R.N.), A. Leitch (Capt., R.A.M.C., T.F.), G. W. Clark (Capt., R.A.M.C.), J. A. Gordon (Surg., R.N.), J. Grimoldby (Surg., R.N.), J. M. Bangay (Surg., R.N.), A. G. Holman (Surg., R.N.), H. H. Gellert (Surg., R.N.), E. D. Granger (Surg., R.N.), F. Roberts (Capt., R.A.M.C.), J. P. I. Hartly (Capt., R.A.M.C., T.F.), C. C. Fitzgerald, M.C. (Capt., R.A.M.C.), H. N. Holt (Capt., R.A.M.C.), H. J. Bates (Surg., R.N.), J. Lawson (Capt., R.A.M.C., S.R.), T. C. St. C. Morton (Surg., R.N.), R. M. Dannatt (Surg., R.N.), E. N. H. Gray (Capt., R.A.M.C., S.R.), H. J. Orr-Ewing (Capt., R.A.M.C.), D. G. Boddie (Surg., R.N.), M. R. O. Wilson (Surg., R.N.), H. M. S. Turner (Capt., R.A.M.C.), J. J. Sinclair (Capt., R.A.M.C.), W. H. Payne (Capt., R.A.M.C.), J. E. Cox (Capt., R.A.M.C.), A. W. Weston (Capt., R.A.M.C.), C. Webb (Capt., R.A.M.C., T.F.), H. Y. Riddell (Capt., R.A.M.C.), J. T. Thomas (Surg., R.N.), R. J. Hearn (Capt., R.A.M.C.), J. R. Russell (Capt., R.A.M.C.), E. P. Chennells (Capt., R.A.M.C.), A. J. O. Wigmore (Capt., R.A.M.C.), J. Duffin (Surg., R.N.), O. H. Gotch (Surg., R.N.), J. Keenan (Capt., R.A.M.C.), F. J. P. Saunders (Capt., R.A.M.C.), T. F. C. E. Kindersley (Surg., R.N.), D. Wilson (Capt., R.A.M.C.), H. B. Smith (Capt., R.A.M.C.), P. W. McKeag (Capt., R.A.M.C.), J. J. C. Hamilton (Capt., R.A.M.C., T.F.), A. F. Rook (Capt., R.A.M.C.), F. Irvine (Capt., R.A.M.C.), R. L. Roe (Capt., R.A.M.C.), P. H. Hadfield (Capt., R.A.M.C.), L. G. Davies (Capt., R.A.M.C.), H. Harvey (Capt., R.A.M.C.), A. J. Davoren (Capt., R.A.M.C.), T. S. Rippon (Capt., R.A.M.C.), C. Salkeld (Capt., R.A.M.F.), O. Gleeson (Capt., R.A.M.C., T.F.), W. R. Kemp (Capt., R.A.M.C., T.F.), N. R. Williamson (Capt., R.A.M.C., T.F.), T. R. F. Kerby (Surg., R.N.), F. H. Bowen (Capt., R.A.M.C.), H. W. Pigeon (Capt., R.A.M.C.), W. R. Nasmith (Capt., R.A.M.C.), C. P. C. Sargent (Capt., R.A.M.C., T.F.), E. Brown (Capt., R.A.M.C.), W. H. Anderson (Capt., R.A.M.C.), J. L. Whitley (Capt., R.A.M.C.), A. Thompson (Capt., R.A.M.C.), A. E. F. Huntsman (Capt., R.A.M.C.), R. A. G. Elliott (Capt., R.A.M.C.), W. F. Walker (Capt., R.A.M.C.), R. D. Neagle (Surg., R.N.), E. W. Longden (Capt., R.A.M.C.), W. B. Loveless, M.C. (Capt., R.A.M.C.), A. E. McCulloch (Capt., R.A.M.C.), R. W. Pritchard (Surg., R.N.), H. E. Whittingham (Capt., R.A.M.C.), D. Cameron (Capt., R.A.M.C.), F. J. Murphy (Capt., R.A.M.C.), S.R.), J. E. Cable (Capt., R.A.M.C.), H. N. Wright (Capt., R.A.M.C.), J. S. Stevenson (Capt., R.A.M.C.), L. C. Rivett (Capt., R.A.M.C.), T. R. Hunter (Capt., R.A.M.C.), E. P. Carmody (Capt., R.A.M.C.), F. C. Jobson (Capt., R.A.M.C.), T. R. S. Thompson (Surg., R.N.), D. Ranken (Capt., R.A.M.C.), L. A. Walker (Capt., R.A.M.C.), W. P. Whippell (Capt., R.A.M.C.), R. H. Robbins (Capt., R.A.M.C.), J. D. Bridger (Capt., R.A.M.C.), R. H. Dixon (Capt., R.A.M.C.), A. B. Rooke (Capt., R.A.M.C.), F. C. Morgan (Capt., R.A.M.C.), L. C. M. Wedderburn (Surg., R.N.), A. E. B. Sim (Capt., R.A.M.C.), C. Visger (Capt., R.A.M.C.), W. M. Jeffreys (Capt., R.A.M.C.), L. C. Smith (Capt., R.A.M.C.), E. R. Bastard (Capt., R.A.M.C.), L. C. Blackstone (Capt., R.A.M.C.), G. Lewin (Capt., R.A.M.C.), W. A. Simpson (Capt., R.A.M.C.), K. B. Aikman (Surg., R.N.), A. W. P. Pirie (Capt., R.A.M.C.), A. H. Wade (Capt., R.A.M.C.), W. Bannerman (Capt., R.A.M.C.), A. B. Lindsay (Capt., R.A.M.C.), H. J. Shanley (Capt., R.A.M.C., T.F.), J. J. O'Mullane (Capt., R.A.M.C.), J. Gardner (Capt., R.A.M.C.), T. E. Regan (Capt., R.A.M.C.), E. T. D. Fletcher (Surg., R.N.), C. J. Miner (Capt., R.A.M.C.), C. E. Lowe (Capt., R.A.M.C.), M. R. Dobson (Capt., R.A.M.C.), O. May (Capt., R.A.M.C.), J. Hocken (Capt., R.A.M.C.), S. H. de G. Pritchard (Capt., R.A.M.C., S.R.), C. Peacock (Capt., R.A.M.C.), C. P. Strong (Capt., R.A.M.C.), A. H. L. Thomas (Capt., R.A.M.C.).

J. D. Cherry is granted a temp. commn. as Capt.; Nov. 22nd.

The following are granted temp. commns. as Lieuts. (Oct. 1st, seniority April 1st):—J. W. Brash (Lieut., R.A.M.C., S.R.); J. A. Johnson (Lieut., R.A.M.C.); P. M. Roberts (Lieut., R.A.M.C.); C. T. Costello (Lieut., R.A.M.C.).

The following are granted temp. commns. as Lieuts.:—J. Prendergast; Nov. 22nd. T. J. X. Canton; Nov. 25th. Medical (Ad.) E. W. Gregory (Capt., R.A.M.C., T.F.) is granted a temp. commn. as Capt.; Oct. 1st, seniority April 1st.

Chaplains' Branch.

R. E. V. Hanson (late Chaplain to the Forces, 2nd Class, A.C.D.) is granted a permanent commn. as Chaplain, with the relative rank of Lieut.-Col., and is granted relative rank of Col. whilst employed as Deputy Chaplain-in-Chief; Nov. 21st.

The following are granted permanent commns. as Chaplains with the relative rank of Maj., and are granted relative rank of Col. whilst employed as Deputy Chaplains-in-Chief:—H. Marshall (late Chaplain to the Forces, 3rd Class, A.C.D.); J. R. Walkley (late Chaplain to the Forces, 3rd Class, and temp. Chaplain to the Forces, 2nd Class, whilst Deputy Assistant Chaplain-General, A.C.D.); Nov. 21st.

The following are granted temp. commns. as Chaplains with the relative rank of Capt.:—H. Hole, H. E. Horton, H. E. Ruddy, J. M. Wood-Smith; Nov. 21st. E. J. Martyn-Roberts (late Temp. Chaplain to the Forces, 4th Class, A.C.D.), E. Roberts, J. R. Tower; Nov. 22nd.

Memoranda.

Lieut. L. A. Rushbrooke to be actg. Capt. whilst specially employed; Nov. 15th.

Sec. Lieut. R. W. Hodges to be Hon. Maj.

Sec. Lieut. (Hon. Lieut.) R. Hodge to be Hon. Capt.

The notification in *Gazette*, Oct. 29th, concerning Sec. Lieut. R. E. F. L. Bristow is cancelled.

London Gazette, November 29th.

The following temporary appointments are made at the Air Ministry:—**Staff Officers, 1st Class.**—And to retain the actg. rank of Lieut.-Col. while so employed:—Maj. (actg. Lieut.-Col.) C. H. Butler, D.S.O., D.S.C.; Oct. 8th. Maj. (actg. Lieut.-Col.) G. S. Peacock; Nov. 20th.

Staff Officer, 2nd Class.—Capt. (actg. Maj.) G. A. Sinclair-Hill, and to retain the actg. rank of Maj. while so employed; Nov. 23rd.

Staff Officers, 3rd Class.—And to be actg. Capt. while so employed, if not already holding that rank:—Sec. Lieut. (actg. Lieut.) R. V. J. S. Hogan; Nov. 11th. Maj. I. A. S. Cooke, Lieut. J. S. Stooke-Vaughan; Nov. 14th.

The following temporary appointments are made:—

Staff Officer, 2nd Class.—Capt. J. A. Hartcup, and to be actg. Maj. while so employed; Aug. 6th.

Staff Officers, 3rd Class.—Lieut. (actg. Capt.) V. Stranders, and to retain the actg. rank of Capt. while so employed, vice Capt. A. E. Hartley; June 11th (substituted for notification in *Gazette* Oct. 4th). Lieut. W. H. Date, and to be actg. Capt. while so employed, vice Lieut. (actg. Capt.) I. H. P. McEwen; Oct. 26th.

Staff Officer, 4th Class (2nd Grade).—Lieut. H. W. Clayton; Oct. 25th.

Staff Lieut., 2nd Class (P.).—Lieut. W. F. Duff; Aug. 30th.

Flying Branch.

Lieut. (actg. Maj.) J. S. Barnes retains the actg. rank of Maj. whilst employed as Maj. (A. and S.), from (S.O.); June 25th.

Capt. (actg. Maj.) G. E. Hervey, D.S.C., to be Capt. (A.) from (T.), and relinquishes the actg. rank of Maj.; Nov. 25th.

Lieuts. to be actg. Capt. while employed as Capt. (A.):—W. K. Sutton; Sept. 1st. R. W. Reeve, A. J. G. Styrian, M.C.; Oct. 18th. (Hon. Capt.) L. N. Sutherland; Oct. 24th. T. H. French, D.F.C., D. F. Leprik; Nov. 1st. E. M. Henderson, A. E. Morgan, G. C. O'Donnell, H. E. Sheppard, H. E. Walker, M.C.; Nov. 4th.

Lieuts. (K.B.) to be Lieuts. (A.):—C. E. Mott; Oct. 3rd. A. S. Anderson; Oct. 31st.

Lieuts. to be Lieuts. (Airship):—J. Buckley, from (A.); Oct. 14th. W. G. Hasler, from (O.); Oct. 26th. D. P. Farrant, from (K.B.); Oct. 28th. B. J. Blackett (Lieut., A.F.C.) is granted a temp. commn. as Lieut. (Obs. Officer); Nov. 1st.

Lieuts. (Ad.) to be Sec. Lieuts. (A.), and to be Hon. Lieuts.:—D. F. Anderson; Oct. 23rd. R. W. Ernest, Lord Grimthorpe; Nov. 5th.

The following are granted temp. commns. as Sec. Lieuts. (A.):—M. B. Lewis (Sec. Lieut., Tank Corps); July 7th. W. B. Beale (Lieut., E. Kent R., S.R.), and to be Hon. Lieut.; July 28th. B. E. Randall (Temp. Sec. Lieut., R. Fus.); July 29th. G. Ibberson (Lieut., Bord. R.), and to be Hon. Lieut.; Aug. 8th. R. Wannell (Sec. Lieut., Devon R., S.R.); Aug. 11th. W. H. Norman (Lieut., R.F.A.), and to be Hon. Lieut.; Aug. 13th. C. B. A. Chase (Sec. Lieut., R.F.A., S.R.); Aug. 14th. H. R. Gunner (Temp. Lieut., R. Irs. R.), and to be Hon. Lieut.; Aug. 15th. R. W. C. Glassborow (Lieut., Sea. Hrs., S.R.), and to be Hon. Lieut.; A. H. Day (Sec. Lieut., Ches. R., S.R.); Aug. 16th. O. A. Peters (Lieut., W. York. R.), and to be Hon. Lieut.; Aug. 17th. A. L. G. Price (Lieut., Som. L.I., T.F.), and to be Hon. Lieut.; J. W. H. Lett (Sec. Lieut., L.A.R.O.); Aug. 19th. C. B. Percy (Sec. Lieut., Wilts. R.); Aug. 21st. F. R. Ashmead (Temp. Capt., Glouc. R.), and to be Hon. Capt.; Aug. 22nd. J. Martin, M.M. (Sec. Lieut., R.F.A., S.R.); Aug. 24th. C. G. K. Pile (Temp. Lieut., Res. Cav.), and to be Hon. Lieut.; Aug. 30th. W. J. Jackson (Lieut., Rif. Brig.), and to be Hon. Lieut.; Sept. 4th. J. H. Partridge (Temp. Capt., Glouc. R.), and to be Hon. Capt.; Sept. 7th. G. L. S. Lightfoot (Temp. Lieut., Wilts. R.), and to be Hon. Lieut.; Sept. 11th. J. L. Hamilton (Temp. Lieut., New Armies, Gen. List), and to be Hon. Lieut.; Oct. 19th. H. Symons (Lieut., Hert. R., T.F.), and to be Hon. Lieut.; Oct. 24th. H. A. Crommelin (Sec. Lieut., W. Rid. R.); Oct. 25th. C. J. Minister (Lieut., York R., T.F.), and to be Hon. Lieut.; E. S. Willis (Temp. Sec. Lieut., E. York. R.), T. A. Spradbury (Sec. Lieut., R. War. R., T.F.), R. Tully (Temp. Lieut., Lab. Corps), and to be Hon. Lieut.; P. D. Brookes (Sec. Lieut., Lond. R., T.F.); Oct. 26th. R. Turner, M.C. (Temp. Lieut., York and Lancs. R.), and to be Hon. Lieut.; E. C. H. Jones (Lieut., S. Wales Bord.), and to be Hon. Lieut.; Oct. 27th. R. D. Hunnam (Sec. Lieut., Gord. Highrs., T.F.), H. S. Colls (Sec. Lieut., Lond. R., T.F.), C. C. G. Logie (Sec. Lieut., Cam. Highrs.), L. D. Wright (Sec. Lieut., Midd'x R., T.F.), D. Morford (Temp. Sec. Lieut., Tank Corps), H. S. Fane (Sec. Lieut., R. War. R., S.R.), J. Bennie (Sec. Lieut., R. Scots, T.F.), W. R. Hutchins (Sec. Lieut., R.F.A., S.R.); Oct. 28th. J. G. Towers (Temp. Lieut., Bedf. R.), and to be Hon. Lieut.; C. S. Williams (Temp. Sec. Lieut., S. Staff. R.), H. W. Vernon (Lieut., R. Fus., T.F.), and to be Hon. Lieut.; L. O. Atkins (Lieut., E. Surr. R., S.R.), and to be Hon. Lieut.; C. K. Johnston, M.C. (Lieut., Bedf. R., S.R.), and to be Hon. Lieut.; T. G. Finney (Temp. Sec. Lieut., Lab. Corps), G. R. Steedman (Sec. Lieut., W. York. R., S.R.), E. W. Handley (Temp. Sec. Lieut., attd. K.R.R.C.); Oct. 29th. R. L. Coote (Lieut., W. Ont. R., C.E.F.), and to be Hon. Lieut.; P. S. Blowey (Sec. Lieut., Dev. R.), A. V. Crebbin (Lieut., Notts and Derby R.); Oct. 30th. A. P. Hitchens (Temp. Lieut., R.E.), and to be Hon. Lieut.; P. Robertson (Lieut. Cam'n. Highrs., S.R.), and to be Hon. Lieut.; R. J. Read (Temp. Sec. Lieut., York L.I.), S. E. Allenby (Sec. Lieut., W. York. R., T.F.), C. S. Groves (Lieut., A.S.C., T.F., attd. North'd. Fus.), and to be Hon. Lieut.; W. L. Alderson (Temp. Sec. Lieut., Ches. R.), J. Stables (Sec. Lieut., Gord. Highrs., T.F.); Oct. 31st. F. G. Urnston (Sec. Lieut., K. L'pool R., T.F.), L. F. Stevenson (Lieut., Quebec R., C.E.F.), and to be Hon. Lieut.; Nov. 1st. W. A. Peggs

(Sec. Lieut., Notts and Derby R.), W. N. Parkin (Sec. Lieut., York and Lancs. R., T.F.); Nov. 5th. M. D. Orr, M.M. (Lieut., Nova Scotia R., C.E.F.), and to be Hon. Lieut., A. H. Bosher (Temp. Sec. Lieut., E. Surr. R.), R. W. Mitchell (Temp. Sec. Lieut., Rif. Brig.), F. C. Lyall (Lieut., R. Fus.), and to be Hon. Lieut.; Nov. 6th. F. C. C. Grundy (Temp. Sec. Lieut., North'd Fus.); Nov. 7th.

The following Prob. Flight Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lieuts. (A.):—R. M. Walkey; May 13th. E. R. Bradley; May 14th. A. E. Hounson; July 19th. C. E. Mallone; Oct. 25th. G. F. Fountain, R. R. Gilpin, W. R. Wright; Oct. 26th. E. P. A. Topley, G. A. Carver; Oct. 29th. J. Hague, T. H. Heald, H. G. Blass, C. F. Temple, J. F. Newton; Oct. 30th. C. T. Dawson, A. G. Hawkins; Nov. 1st. F. H. Pidgeon, D. P. Smith; Nov. 5th.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (A.):—137881 W. A. Raw; Sept. 7th. 29812 S. J. Brickstock, 128177 A. W. McDonald, 154710 J. B. Brown; Oct. 28th. 154904 B. C. Longmire, 152971 J. W. Lavole; Oct. 29th. 154732 C. A. Hillock; Nov. 1st. 316026 V. N. Merrill, 29111 J. Woods, 950695 F. A. Wray; Nov. 7th. 625760 A. J. M. Tuck, 128801 G. O. Anderson, 110055 J. M. S. Taylor, 26184 T. Eden, 15/58416 H. R. Wolton, 154692 B. R. Brown, 37475 E. A. D. Watmough; Nov. 8th. 9/22461 H. E. Crook, 13539 R. A. McDowall, 536204 W. T. R. Flemington, 234019 J. L. White, 154674 T. E. McFeely, 110195 W. T. Gundry, 642629 H. A. Barrett; Nov. 9th. 154611 G. W. French, 105029 A. G. Hatten, 66119 A. Petty, 625727 C. C. Thurrell, 348550 W. O'Dell, 117730 W. J. Offord, 100234 F. H. T. Rudkin, 117160 J. R. Baxter, 9621 A. J. H. G. Taylor, 117185 D. G. Hood, 329873 C. E. O'Grady, 082787 V. L. Cockle; Nov. 10th. 128551 C. F. Arthur, 171256 W. Wilson, 48307 G. W. Perks, 512493 T. J. Mann, 117657 A. S. Evans, 117763 J. R. Astin, 87162 F. A. Beardmore, 23206 G. N. Richmond, 551844 C. H. Main, 107146 H. W. P. Carew, 117567 F. H. Redfern, 10230 E. T. Gregory, 3/28386 R. W. L. Pearson, 79097 A. Tibbles, 288147 I. O. Pugh; Nov. 11th. 208165 S. H. Coventry, 87242 A. N. Kelsey, 94787 D. G. Searls; Nov. 12th. 137721 W. A. Barratt, 374685 R. B. Palmer, 54326 L. Kehoe, M2/054678 S. Brown, 170294 D. West, 45864 W. Nightingale, M2/047626 J. Gallacher, 30277 C. R. Cooke; Nov. 13th. 68337 LeR. Mattern, 110298 J. C. S. Calder, 93125 A. K. Gill, 117831 D. B. Thomson, 535427 R. L. Palmer, 137467 T. F. Thorogood, 35533 E. C. Kingston, M2/1021598 F. H. Kay, 110372 W. F. Howett, 37553 H. B. London, 110108 J. R. B. Kay, 117360 A. J. Ward; Nov. 14th. 94813 T. F. Davenport, 470910 C. W. Browell, 110344 F. O. Townsend, 146299 P. Robinson, 110565 T. J. Warwick, 100738 E. G. Clarke; Nov. 15th. 117354 P. F. Keevil, 117511 F. G. Stevens, 10/91331 R. Jurgans, 117337 W. A. Westwood; Nov. 16th.

To be Sec. Lieuts. (Airship):—Lieut. F. E. Bishop, and to be Hon. Lieut., from (T.); June 19th. Sec. Lieut. (Hon. Lieut.) V. J. Copestone, and to be Hon. Lieut., from (T.); Oct. 14th. Sec. Lieut. F. A. Downer, from (T.); Oct. 15th. Lieut. W. W. Honeywood, M.C., and to be Hon. Lieut., from (Ad.); Oct. 28th. Capt. N. S. Senneth, and to be Hon. Capt., from (Admin.); Oct. 29th.

The following are granted temp. commns. as Sec. Lieuts. (A/ship):—H. K. B. Trollope (Lieut., S.A. Horse), and to be Hon. Lieut.; Oct. 14th. G. Granger (Temp. Sec. Lieut., R.E.); Oct. 15th. C. B. Clark (Lieut., E. Ont. R., C.E.F.), and to be Hon. Lieut.; Oct. 16th. G. N. Snowball (Temp. Sec. Lieut., North'd Fus.); Oct. 26th. A. W. Graig (Capt., S.A. Forces), and to be Hon. Capt.; Oct. 28th. G. W. Watkins (Temp. Sec. Lieut., Ches. R.); Oct. 20th.

The following Prob. Flight Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lieuts. (A/ship):—D. F. E. Whitehouse, R. J. Siddall; Oct. 14th. G. R. B. Dixon; Oct. 29th.

Rev. A. C. Rees is granted a temp. commn. as Sec. Lieut. (A.) and (S.); June 27th.

A. E. Hounson (Prob. Flight Officer, late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A. and S.); July 19th.

The following are granted temp. commns. as Sec. Lieuts. (K.B.):—F. Haveland (Sec. Lieut., R.G.A.); Aug. 11th. G. E. S. Lamb (Sec. Lieut., R.F.A., S.R.), E. F. Murphy (Sec. Lieut., R.G.A., S.R.), F. W. Dunnett, M.C. (Sec. Lieut., R.F.A., S.R.); Oct. 8th.

J. R. Filmer (Lieut., R.F.A., T.F.), and to be Hon. Lieut.; Oct. 20th. R. C. E. Verne (Sec. Lieut., R.F.A., S.R.); Oct. 21st.

S. Brooke, M.C. (Capt., York and Lanc. R., T.F.), and to be Hon. Capt.; Nov. 5th.

Sec. Lieut. M. L. Williams to be Observer Officer, from (A.); Oct. 8th.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their ranks as Sec. Lieuts. (Observer Officers):—F. H. Burns, W. A. Owens; April 18th. T. Dootson; April 24th. V. V. Anderson, D. O. Duthie, A. Findley, W. N. Hicks, H. Pritchett; May 12th. T. P. T. Jones; May 20th. C. G. Haigh, J. I. Laing; June 6th. R. E. S. Gibson; June 18th. E. M. Boxer; Sept. 6th. J. Ferguson; Sept. 21st. (Date of first commission March 9th.)

The following are granted temp. commns. as Sec. Lieuts. (Obs. Officers):—J. E. Kendrick, D.F.C. (Temp. Sec. Lieut., New Armies, Gen. List); April 7th. G. A. Hunter (Sec. Lieut., Dorset R., T.F.); April 18th. F. H. V. Wood (Temp. Sec. Lieut., attd. Middl'x. R.); May 4th. W. L. Kendrick (Temp. Lieut., A.O.D.), and to be Hon. Lieut.; May 8th. H. A. Deakin (Lieut., S. Staff. R.), and to be Hon. Lieut.; May 12th. R. S. Hellier, D.F.C. (Temp. Capt., S. Lan. R.), and to be Hon. Capt.; May 26th. R. Boyle (Sec. Lieut., R.F.A., S.R.); May 27th. A. Smith (Temp. Lieut., Linc. R.), and to be Hon. Lieut., F. Ibbotson (Temp. Sec. Lieut., Notts and Derby R.); June 1st. E. R. Airey (Sec. Lieut., W. Rid. R., T.F.), R. J. Baddeley (Lieut., Manch. R., T.F.), and to be Hon. Lieut., E. Colvill (Sec. Lieut., Sco. Rif., T.F.); A. E. Chadwick (Sec. Lieut., Durh. L.I., T.F.), E. H. Clarke (Temp. Lieut., Brit. W.I.R.), and to be Hon. Lieut., E. E. Richardson, M.M. (Temp. Sec. Lieut., E. Surr. R.), C. R. A. Wallis (Lieut., R.G.A.), and to be Hon. Lieut., A. L. Wimshurst (Lieut., N. Staff. R., T.F.), and to be Hon. Lieut.; June 6th. A. H. Mellows (Capt., Hunts. Cyc. Bn., T.F.), and to be Hon. Capt.; June 21st. S. A. Garratt (Temp. Sec. Lieut., Res. R. of Cav.); June 27th. V. Soper (Lieut., Dorset R., T.F.), and to be Hon. Lieut.; July 4th. T. A. Tindle (Lieut., Wilts. R., T.F.), and to be Hon. Lieut.; July 11th. A. Bentley (Temp. Sec. Lieut., M.G. Corps); July 15th. T. R. Evans (Temp. Lieut., Suff. R.), and to be Hon. Lieut.; Aug. 1st. H. Goodwin (Temp. Sec. Lieut., S.A. Inf.); Aug. 6th. A. Murray (Sec. Lieut., Cam'n. Highrs.), A. M. Parkes (Temp. Lieut., Labour Corps), and to be Hon. Lieut., R. D. De Pass (Lieut., Middl'x. R., T.F.), and to be Hon. Lieut.; Aug. 9th. R. C. Revelle (Temp. Sec. Lieut., Oxf. and Bucks. L.I.); Aug. 19th. V. R. Husband (Lieut., R.F.A.), and to be Hon. Lieut.; Aug. 21st. H. J. Knudsen (Temp. Lieut., R. Lan. R.), and to be Hon. Lieut.; Aug. 22nd. F. H. Butler (Lieut., Res. Cav. R.), and to be Hon. Lieut.; Aug. 27th. P. A. Cooper (Lieut., Sappers and Miners), and to be Hon. Lieut.; Aug. 31st. G. H. Phillips (Lieut., Can. Eng., C.E.F.), and to be Hon. Lieut., J. A. Shepherd, M.C. (Lieut., N. Lan. R.), T.F., and to be Hon. Lieut.; Oct. 24th. M. Owen (Temp. Sec. Lieut., R. W. Kent R.), J. Bevan (Temp. Sec. Lieut., York R.), V. P. B. Thomas (Temp. Sec. Lieut., Yorks. L.I.); Oct. 5th. B. M. Storey (Temp. Lieut., Leic. R.), and to be Hon. Lieut., H. J. E. Whitfield (Temp. Sec. Lieut., Durh. L.I.), R. W. Course (Lieut., W. Ont. R., C.E.F.), and to be Hon. Lieut., R. A. Edmonson (Lieut., North'd. Fus., T.F.), and to be Hon. Lieut., G. A. Gamble, M.C. (Lieut., Yorks. L.I.), and to be Hon. Lieut., J. B. Hutcheson (Lieut., Sask. R., C.E.F.), and to be Hon. Lieut., H. G. Sansom (Temp. Sec. Lieut., Dorset R.); Oct. 28th. A. T. Barker, M.C. (Temp. Sec. Lieut., R.E.); Oct. 29th. J. H. E. Biggs (Sec. Lieut., K.R. Rif. C., S.R.);

Oct. 30th. J. A. L. Brown (Sec. Lieut., Notts and Derby R., T.F.), F. S. Tooley, M.C. (Temp. Lieut., R. Ir. Rif.), and to be Hon. Lieut., R. C. Crook, M.C. (Lieut., R.F.A., T.F.), and to be Hon. Lieut., A. V. Wells (Lieut., Notts and Derby R., T.F.), and to be Hon. Lieut., H. W. Beck (Capt., N. Staff. R., T.F.), and to be Hon. Capt., J. Tee, M.C. (Sec. Lieut., R.F.A., S.R., D. H. Batty (Temp. Sec. Lieut., Middl'x. R.), A. W. C. Bayes (Sec. Lieut., R.F.A., S.R.), D. H. Cameron (Sec. Lieut., High. L.I., T.F.), W. Kidd (Sec. Lieut., High. L.I.), R. Langlands (Temp. Sec. Lieut., Dur. L.I.), V. Limerick (Sec. Lieut., R.F.A., T.F.), A. E. Mileham (Sec. Lieut., R.W. Kent R., T.F.), A. Hill (Temp. Sec. Lieut., Army Cyclist Corps), R. D. Poland (Lieut., Lond. R., T.F.), and to be Hon. Lieut., R. T. Symond, M.C. (Sec. Lieut., L'pool R., T.F.), H. Taylor, M.C. (Lieut., Lond. R., T.F.), and to be Hon. Lieut., R. Wilkinson (Temp. Sec. Lieut., York R.); Oct. 31st. A. R. Beveridge (Lieut., C. Ont. R., C.E.F.), and to be Hon. Lieut., F. Coxen (Lieut., R.F.A.), and to be Hon. Lieut., T. O. Harvey (Sec. Lieut., R.F.A., S.R.), R. R. Layte, M.C. (Capt., Nova Scotia R., C.E.F.), and to be Hon. Capt., C. D. Moorhead (Lieut., Manch. R.), and to be Hon. Lieut., G. G. Ross-Smith (Lieut., R.G.A., S.R.), and to be Hon. Lieut., E. P. Whitehead, M.C. (Lieut., Manch. R.), and to be Hon. Lieut.; Nov. 1st. T. G. L. Harris (Sec. Lieut., Oxf. and Bucks. L.I., T.F.), C. W. Harry (Sec. Lieut., Lond. R., T.F.), W. E. Franklin (Sec. Lieut., Oxf. and Bucks. L.I., T.F.), H. Bardsley (Lieut., A.S.C., T.F.), and to be Hon. Lieut.; Nov. 3rd. T. L. Lowe (Sec. Lieut., N. Staff. R., T.F.); Nov. 4th. H. K. Pople, M.C. (Sec. Lieut., Som. L.I., T.F.), A. A. Campbell (Sec. Lieut., R.F.A., S.E.), A. Buckley (Temp. Lieut., Manch. R.), and to be Hon. Lieut., T. C. W. Sandland (Temp. Lieut., York R.), and to be Hon. Lieut., W. G. Millar (Sec. Lieut., R.F.A., S.R.), R. Bretherton (Sec. Lieut., R.G.A., S.R.), P. W. Robinson (Sec. Lieut., R.F.A., S.R.), T. L. Gann (Sec. Lieut., R.G.A., T.F.), S. G. Amor (Sec. Lieut., Wilts. R., T.F.), A. W. B. Singer (Sec. Lieut., Sco. Rif., T.F.), F. C. Morgan (Temp. Sec. Lieut., attd. Welsh R.), P. G. Allday (Lieut., R.F.A., T.F.), and to be Hon. Lieut., MacA. Bexon (Sec. Lieut., R.F.A., T.F.), J. L. Lund, M.C. (Sec. Lieut., R.F.A., S.R.), A. MacArthur (Temp. Sec. Lieut., R. Scots), J. K. Pollitt (Sec. Lieut., Linc. R., S.R.); Nov. 7th.

The following Prob. Obs. Ofcs. (late R.N.A.S.) are granted temp. commns. as Sec. Lieuts. (Obs. Officers):—G. S. Cowie; Oct. 18th. S. L. Hudson, E. S. Marsh; Oct. 25th.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (Obs. Officers):—200062 E. E. Baskcombe-Harrison; July 27th. 177776 M. de Verteuil; Aug. 3rd. 305582 G. Cockburn; Sept. 28th. 37704 S. H. Cooper; Oct. 3rd.

The following Prob. Flight Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lieuts. (S.):—C. P. Bristow, A. J. Stubbings; June 14th. A. Holden; July 5th. J. W. Bell; Sept. 7th. J. Lomas; Oct. 22nd. J. E. Hughes, E. D. H. Davies, H. V. C. Pennell, C. B. Smith; Oct. 27th. H. St. Clair; Oct. 31st. P. B. Agur, A. C. Meredith, E. H. Brand; Nov. 7th.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (S.):—T/062458 G. A. Evans; Oct. 14th. 316096 J. B. Palmer, 19759 C. Sagon; Oct. 27th. 129607 P. M. Barr; Nov. 15th.

Capt. W. H. A. Whitworth, M.C. (Capt., Dor. R., T.F.), relinquishes his commn. on ceasing to be employed; Nov. 30th.

The following Lieuts. relinquish their commns. on account of ill-health contracted on active service, and are granted hon. rank of Lieut.:—N. H. Lahaye, A. E. McManus, T. H. Moorwood, R. G. Robertson, D. Welch; Nov. 30th.

Lieut. J. H. P. McGarry (Essex R., T.F.) relinquishes his commn. on account of ill-health contracted on active service; Nov. 30th.

The following Lieuts. relinquish their commns. on account of ill-health, and are granted hon. rank of Lieut.:—A. E. Flynn, F. M. Woolner; Nov. 30th.

Lieut. E. Greenwood relinquishes his commn., being physically unsuited for duties of pilot or observer; Nov. 30th.

Sec. Lieut. J. N. Hamman resigns his commn., and is granted hon. rank of Sec. Lieut.; Nov. 30th.

Surname of Sec. Lieut. V. C. Cordingley is as now described, and not as in *Gazette* Sept. 3rd.

Christian names of Flight Cadet James William White are as now described, and not as in *Gazette* Sept. 17th.

Christian name of Flight Cadet George Wilkie is as now described, and not as in *Gazette* Oct. 11th.

Notification in *Gazette* Aug. 2nd concerning Sec. Lieut. G. E. Hunt is cancelled.

Notification in *Gazette* Oct. 1st concerning Flight Cadet J. H. Chambers is cancelled.

Administrative Branch.

Lieut.-Col. (actg. Col.) W. E. S. Burch to be Lieut.-Col., and relinquishes actg. rank of Col.; Nov. 7th.

Maj. (actg. Lieut.-Col.) H. L. Webb to be Maj., and relinquishes actg. rank of Lieut.-Col., from (S.O.); Oct. 14th.

Cpts. to be actg. Majs. while employed as Majs.:—(Hon. Maj.) H. R. P. Reynolds from (S.O.); Oct. 3rd. G. F. Clark, from (S.O.), W. V. Sherwell; Nov. 18th. Lieuts. (actg. Cpts.) to be actg. Majs. while employed as Majs.:—W. J. King from (S.O.), D. G. Northam; Nov. 18th.

To be actg. Cpts. while employed as Cpts.:—Sec. Lieut. A. E. H. Hales; Nov. 5th. Sec. Lieut. (Hon. Lieut.) A. H. Cabeldu, from (T.); Nov. 9th.

Lieut. W. H. Tait, from (K.B.); Nov. 16th.

C. J. Casey, M.C. (Temp. Capt., Gen. List), is granted a temp. commn. as Capt.; Nov. 9th, seniority from April 1st.

E. V. Bashford is granted a temp. commn. as Lieut.; April 1st (substituted for notification in *Gazette* June 7th).

The following are granted temp. commns. as Lieuts., with seniority from April 1st, and to be actg. Cpts. while employed as Cpts.:—W. E. Cranmer (Temp. Lieut., Middl'x. R.); May 30th. R. E. Martin (Temp. Lieut. and Qrmr., Gen. List); Sept. 23rd.

Lieuts. (A.) to be Lieuts.:—W. R. Collins; Nov. 7th. V. C. Roberts; Nov. 9th. P. W. L. Jarvis; Nov. 22nd.

Lieut. C. J. R. Milton to be Lieut., from (K.B.); Oct. 1st.

Lieuts. (O.) to be Lieuts.:—G. D. A. Heys; Sept. 11th. E. T. Taylor; Oct. 17th.

H. Wright (Temp. Capt., A.S.C.) is granted a temp. commn. as Lieut., and to be Hon. Capt.; Oct. 21st.

Sec. Lieut. A. G. Whittaker to be actg. Lieut. while employed as Lieut.; Oct. 8th.

J. H. E. Weekes is granted a temp. commn. as Sec. Lieut., and to be actg. Lieut. while specially employed; Nov. 11th (substituted for notification in *Gazette* Nov. 22nd).

The following are granted temp. commns. as Sec. Lieuts., and to be actg. Lieuts. while specially employed:—W. H. Bowden, F. J. Brooks, C. S. Broughton, D. M. Brown, F. J. Hall, A. H. Hasler, F. Hook, A. Kendrick, W. E. Lambert, T. E. Mahoney, S. G. Marsh, F. McKeown, C. M. Oram, R. Pringle, H. O. Richards, W. P. Smitten, H. S. Snead, W. J. Spooner, H. W. J. Stone, G. S. Turner, F. R. Whittaker, J. Wilson; Nov. 15th.

E. J. Cotton is granted a temp. commn. as Sec. Lieut.; Oct. 13th.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. (Hon. Lieut.) C. E. Cox, M.C. (Lieut., Middl'x. R.); Oct. 16th.

Capt. I. Davies (Capt., Sher. For., T.F.); Nov. 3rd. Maj. E. Boucher (Staff Paymaster, R.N.); Nov. 8th. Lieut. (actg. Capt.) the Hon. H. C. Smith, and is granted the hon. rank of Lieut.; Nov. 30th.

Lieut. D. Burt relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Lieut.; Nov. 30th.

The following Sec. Lieuts. relinquish their commns. on account of ill-health and are granted the hon. rank of Sec. Lieut.:—B. S. Eytinge, E. G. L. Simpson; Nov. 30th.

Sec. Lieut. T. Martin resigns his commn.; Nov. 30th.

The notification in *Gazette* June 14th concerning Sec. Lieut. S. D. Gardiner is cancelled.

Technical Branch.

Maj. G. L. Wightman to be Maj. (Grade A) from (Ad.); Oct. 19th.

Maj. A. P. Hartley to be graded for pay as Sqdn. Comdr. while employed as Maj. (Grade B) from (A); Aug. 1st.

S. J. L. Vincent (Maj., Spec. List) is granted a temp. commn. as Maj.; July 23rd, seniority April 1st.

A. Crook (Capt. and Qrmr. in Army) is granted a temp. commn. as Capt.; Sept. 28th, seniority April 1st, and to be actg. Maj. while employed as Maj.; (Grade A).

Capt. T. H. Vitty to be actg. Maj. while employed as Maj. (Grade B); Oct. 28th.

Capt. (Hon. Maj.) A. E. Hatton to be Capt., from S.O.; Sept. 2nd.

C. M. Alport (Lieut., R. Highrs.) is granted a temp. commn. as Lieut. (Grade B); May 24th (seniority April 1st, and to be actg. Capt. while holding a special appointment at the Ministry of Munitions).

Lieuts. to be actg. Capts. while employed as Capts. (Grade A):—G. M. E. Bayly, from (O.); April 10th. F. A. Mawdsley; June 21st. W. Dawson; June 29th. H. E. Haslehurst, from (A); Sept. 16th. F. C. Elstob; Sept. 17th. C. L. Willcox; Oct. 11th.

Sec. Lieut. (Hon. Capt.) L. J. J. Murfin to be actg. Capt. while employed as Capt. (Grade A); June 6th.

Lieuts. to be Lieuts. (Grade A):—L. G. Prideaux, from (A); Sept. 6th. W. D. Hogarth, from (Ad.); Sept. 19th.

Lieuts. (O.) to be Lieuts. (Grade A):—S. W. Agar, H. A. Samson; April 1st. R. F. Rowbotham; May 7th. F. C. Estob; May 8th. F. A. Mawdsley; May 29th. F. J. Pullen; June 12th. G. R. Barry; July 14th.

Lieuts. (O.) to be Lieuts. (Grade B):—R. F. L. Bush; May 29th. A. D. K. Craig; Sept. 25th.

Sec. Lieut. (Hon. Lieut.) R. A. Carswell to be actg. Lieut. whilst employed as Lieut. (Grade A); April 1st.

Sec. Lieuts. to be actg. Lieuts. whilst employed as Lieuts. (Grade B):—W. H. Griffith; July 28th. H. T. Hamblin; July 31st.

The following Sec. Lieuts. relinquish their commns. on ceasing to be em-

ployed:—(Hon. Lieut.) J. E. Bottomley (Lieut., Wilts. R., T.F.); Aug. 29th (Hon. Capt.) G. G. Watson, M.C. (Capt., Worc. R., T.F.); Nov. 18th.

Sec. Lieut. A. J. Annandale relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Sec. Lieut.; Nov. 30th.

The notification in *Gazette* Oct. 4th, concerning Lieut. (actg. Capt.) F. B. Bayly is cancelled.

Medical Branch.

A. P. Woolright (late Capt., R.A.M.C.) is granted a temp. commn. as Capt.; Aug. 14th (substituted for notification in *Gazette* Aug. 13th).

The following are granted temp. commns. as Capts.:—W. F. Wilson (late Capt., R.A.M.C.); Nov. 25th. P. A. Hall; Nov. 26th.

The following are granted temp. commns. as Lieuts.:—C. McC. Jones; (Hon. Capt., Ret. List), and to be Hon. Capt.; Nov. 25th. S. G. Seymour; Nov. 26th. W. F. Sheil; Nov. 27th.

The notification in *Gazette*, Nov. 8th, concerning R. J. Aherne (late Temp. Capt., R.A.M.C.) is cancelled.

Chaplains' Branch.

Rev. P. E. Healey (late Temp. Chaplain to the Forces, 4th Class, A.C.D.) is granted a temp. commn. as Chaplain, with the relative rank of Capt.; Nov. 26th.

Memoranda.

L. C. Galloway (late Lieut., R.A.F.) is granted the hon. rank of Lieut.

The following Sec. Lieuts. are granted the hon. rank of Lieut.:—S. U. Dent, N. W. G. Wilkinson.

Lieut. F. A. Whittall to take rank and prec. as if his appointment as Lieut. bore date Sept. 7th.

Royal Flying Corps (Military Wing)

London Gazette Supplement, November 27th.

Flying Officer (Observer).—Lieut. L. W. B. Moore, R.F.A., T.F. (since killed); Oct. 20th, 1917, seniority from Aug. 23rd, 1917.

Equipment Officer, 2nd Class.—Temp. Sec. Lieut. J. H. Jennings, Gen. List, from the 3rd Class, and to be Temp. Lieut. whilst so employed; March 31st.

London Gazette Supplement, November 29th.

Flight Commander.—Temp. Sec. Lieut. C. W. Warman, D.S.O., M.C., Gen. List, from a Flying Officer, and to be Temp. Capt. while so employed; Aug. 19th, 1917.

Equipment Officers, 2nd Class.—From the 3rd Class, and to be Temp. Lieuts. while so employed:—Sec. Lieut. W. H. G. Furnivall, S.R.; Temp. Sec. Lieut. P. G. Pickwell, Gen. List; April 1st, 1917.



Flying in Company in Fog

Two aeroplanes, each with nine passengers, had a somewhat remarkable experience on November 27th. Leaving Richmond at 10 a.m. the machines flew across to the Headquarters in France of the Independent Air Force, the passage across the Channel occupying 35 minutes. In the afternoon the return journey was made, and when nearing the Metropolis the machines ran into a fog. Unable to see any landmarks, it is reported, the pilots "felt" their way towards Richmond where they arrived safely at 4.40 p.m., the two machines landing within a few seconds of each other and about 100 ft. apart.

Germany Trying to Sell to Sweden

INFORMATION to hand from Stockholm shows that the German Government are anxiously trying to sell a large number of aircraft to the Swedish Government, including new and second-hand airships and aeroplanes, at prices ranging from £1,000 for monoplanes, to between £1,500 and £2,000 for biplanes. The German Government guarantee that the machines are not included in the number which have to be handed over to the Allies. It is probable that some of these machines are those which the German authorities are bound to accept under outstanding contracts.

"Sweet Lavender"

ARRANGEMENTS are now well in hand for the performance of "Sweet Lavender" by Major Gordon Watney's Dramatic Company in London. It will be given at a matinée under the patronage of the King and Queen at St. James's Theatre on December 12th at 2.30, the proceeds going in aid of St. Dunstan's Hostel. The part of Dick Phenyl is being played by Major Gordon Watney, Lavender by the Hon. Mrs. Rowland Winn, Minnie Gillfillian by Mrs. Gordon Watney, and that of Mr. Geoffrey Wedderburn by the Hon. H. Cavendish Butler. Major Watney's own orchestra will be in attendance, conducted by Mr. Michael Burbeck. Tickets may be obtained from the St. James's Theatre, or direct from Major Gordon Watney, South Lodge, Weybridge.

Aeroplane Wood from Australia

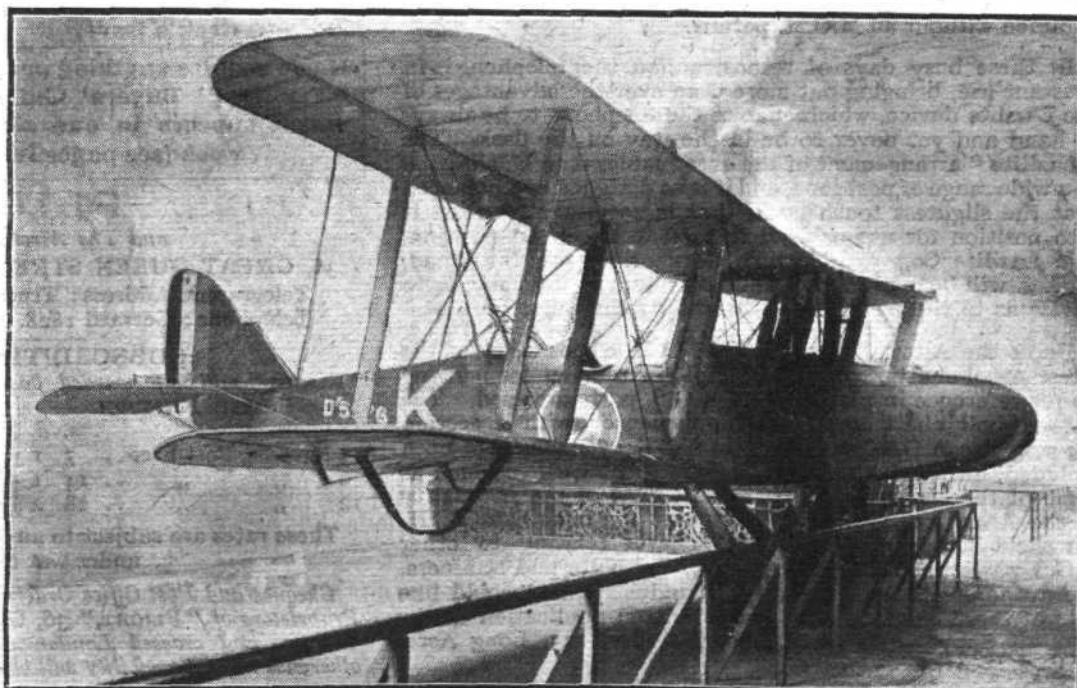
FOR some years the attention of aeroplane builders has been turned towards the possibility of utilising Australian woods for aircraft work, but hitherto it has been generally understood that they are not suitable. Now, apparently, the Air Ministry, in conjunction with the Commonwealth authorities are carrying out tests in Western Australia, with local timbers with a view to obtaining definite information as to whether such woods can be utilised by aircraft builders.

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□ A de H. 9 biplane at the Enemy Aircraft Exhibition, Agricultural Hall.—These machines have done some excellent work at the front, and a similar machine is now going to be turned to more peaceful pursuits, for we learn that Sir Arthur Du Cros has ordered one from the Aircraft Manufacturing Co., Ltd., for his private use.

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SIDE-WINDS

IN view of the success which has attended the fortnightly conferences and discussions now being held by the Industrial Reconstruction Council, and the universal demand for their continuance, a second series has been arranged for January, February and March of next year. They will be held on Tuesdays, as before, in the Hall of the Institute of Journalists, at 6 p.m.

The first, under the title of "Reconstruction or Restoration?" will deal with the general principles which should guide us during the difficult transition period, and will be opened by Major H. J. Gillespie, D.S.O., on January 14th. The other meetings will discuss the Workers' Interest in Costing the Place of the Merchant in British Industry, Welfare Work, Wages and Conditions of Employment in relation to future Industrial Prosperity, and Industry and Educational Reconstruction; the opening address in each case being delivered by Mr. A. Webster Jenkinson, F.C.A. (Controller of Factory Audit and Costs), Sir Charles McLeod (Chairman of the Imperial Commercial Association), Miss Newcome (Secretary of the Central Association of Welfare Workers), Capt. James O'Grady, M.P. (Secretary of the National Federation of General Workers), and Mr. F. W. Sanderson, M.A. (Headmaster of Oundle School).

No tickets will be issued, but all those who intend to be present are asked kindly to inform the Secretary, I.R.C., 2 and 4, Tudor Street, E.C.4, who will be glad to send a full prospectus of the series on application.

FROM Messrs. Brown Brothers, of Great Eastern Street, E.C., come particulars of the "Autoclipse" Dope Can, for which they are the wholesale agents. It is round, 7 ins. diameter, and has an inclined mouth to ensure the return of all excess material lifted by the brush, while the bottom is hollowed to enable all the contents to be used. A bail handle is fitted, and there is also a palette grip. It is made in two styles—one with a plain flap and the other with an aperture to accommodate the brush handle—and the price of either is 6s.

THE first dinner and concert of the Athletic Club formed in connection with the firm of Rubberine, Ltd., was held at Torino's on the 27th ult., and it is hoped that it will be the first of a long series of similar fixtures. Mr. Arthur T. Marks, Managing Director of the firm and president of the Club, was in the chair, supported by Mr. Sydney Tappenden, Works Manager and Vice-President. An excellent musical programme was under the direction of Mr. J. Green, Secretary of the Club, and among those who contributed were Miss Coxhead and Messrs. G. Goodley, S. Tappenden, H. A. Woodford, W. Wallace and P. Daveney. During the interval the Chairman presented medals (provided by the firm) to the tug-o-war team to commemorate their winning the challenge cup at the London Munition Sports held at Herne Hill in July last.

A LINE from the Acetylene Equipment Co., Ltd., of 268-270 South Lambeth Road, S.W. 8, reminds us that in consequence of the removal of the restrictions on the sale of calcium carbide, from December 1st D.A. cylinders can now be obtained without an M.O.M. permit.

IN these busy days of reconstruction the telephone is in constant use, bringing out more than ever the advantages of the Lazilite device, which enables the telephone to be always at hand and yet never to be in the way on the desk. The "Lazilite" arrangement of the arm enables it to be adjusted to a wide range of positions, and it is so designed and balanced that the slightest touch is all that is necessary to bring it into position for use or send it back to its closed position. The Lazilite Co., 5, Baldwin's Gardens, Gray's Inn Road, W.C. 2, will be glad to give full particulars at any time, or to advise as to the possibility of installing their system.

FROM the Aircraft Supplies Co., Ltd., comes a set of the latest Ascol charts, which are simply invaluable for hanging up for reference in places where A.G.S. parts are used. The nut-and-bolt chart has been supplemented with a section showing the A.G.S. washers, and A.G.S. eyebolts have been included, although they do not seem to be used so much as some of the other A.G.S. parts. In view of the popularity of the Ascol length and weight chart for bolts, Mr. G. H. Mansfield has prepared similar charts relating to other A.G.S. parts, including nuts, studs, eye-bolts and strainers.

Anyone engaged in the aircraft industry who would like sets of these charts should make written application to the Aircraft Supplies Co., Ltd., Ascol House, 125, Long Acre, W.C. 2.

COMPANY MATTERS

Brown Brothers

THE directors of Brown Brothers have declared an interim dividend of 2½ per cent. (free of tax) on the ordinary shares in respect of the year 1918.

NEW COMPANIES REGISTERED.

ARIEL AEROPLANES AND AIRCRAFT, LTD.—Capital £100, in £1 shares. Aircraft manufacturers, electricians, etc. The subscribers (each with one share) are: O. J. W. Stocks, Birmingham, and L. E. Parsons, Birmingham.

BRADBURY AND JARVIS, LTD.—Capital £2,000, in £1 shares. Mechanical and general engineers, dealers in engines, aeroplanes, components and accessories, etc.

"FLEXIBLES," LTD.—Capital £180,000, in £1 shares. Manufacturers of and dealers in suspensions, springs, tyres, wheels, engines, motor cars, aircraft, and fittings. First director:—E. B. Killen.

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W. R. DOUGLAS SHAW.

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